AMERICAN GAS ASSOCIATION MONTHLY

Vol. I No. 4

April 1919

The Association Monthly invites your attention to:

The Address of Hon. William C. Redfield at the March Conference.

The Papers and Discussions presented before the Conference.

The complete list of company and individual members present.

The date set for the Sixth Annual National Gas Range Week.

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AMERICAN GAS ASSOCIATION
MONTHLY

ADDRESS ALL COMMUNICATIONS TO THE AMERICAN GAS ASSOCIATION, 130 E. 15th ST., NEW YORK, N. Y.

Editor, ... Louis Stotz
Associate Editor, . T. M. Will

Vol. I **APRIL, 1919** **No. 4**

WITH THE EDITOR.

Values in Full

The one general meeting which the American Gas Association has held since its formation was vibrant, both in and out of meeting hall and hours, with the enthusiasm of the members present and a reiteration of their desires, hopes and firm convictions concerning the new era inaugurated by the Association. "Now we can expect, and now we shall get, progressive service from a society backed by experience and led by men who know the value of an aggressive policy."

An advertising service, a window display service, an educational service, a data service, an industrial fuel service, a laboratory service, an investigation service—these are but a few of the services which were definitely mentioned as worthy objects of the Association's active work to provide help and suggestions for company and individual members.

Six months ago two camps of gas men awaited the initiation of activities by the American Gas Association—those who already expressed confidence in its future and those who preferred to wait until tangible evidences of success justified their coming forward. The point advanced by the second class has surely now been answered. The confidence of the first class has been fully justified, for the Association is organized and active. It has even shown itself ready for new undertakings, which, although untried by experience, are recommended by the best judgment at its command.

The Association stands as a fully equipped plant, with every employee in his place, ready to turn out the product which it expects to offer its public. Its management has carefully determined what that product shall be—what activities and services the Association shall at this time undertake in behalf of its members—for unless the articles of its manufacture (to continue the analogy) reach their proper market—the companies and men of the gas industry—the Association will fall short of the expectations of its supporters, and its members will fail to receive full returns on the investments they have made.

The membership list of the American Gas Association is constantly growing—good evidence of the fact that a large number of men of the industry see in a society such as this, a plant that can turn out "products" of definite value to them and their companies; but of this membership list it is only those making active use of the facilities provided by the Association who are really claiming, in full, the values due them.

Affiliated Societies

The American Gas Association is pleased to announce that the following gas societies have entered into an affiliation agreement with the Association, as approved by the Executive Board:

New England Association of Gas Engineers

Illinois Gas Association

Pennsylvania Gas Association

Canadian Gas Association

Wisconsin Gas Association

New Jersey State Gas Association

AMERICAN GAS ASSOCIATION MONTHLY

Vol. I APRIL, 1919 No. 4

Address of Honorable William C. Redfield, Secretary of Commerce, at March Conference of American Gas Association

IN these days, Mr. Chairman and gentlemen, one hesitates to begin to talk, because there is so much to be said.

Only this morning, in thinking of a trip I am to make next week, out as far as Duluth, I was considering what material was available at least to fill in the time of the various bodies which have brought upon themselves the burden of my presence during that week. I soon found, however, that I have no occasion to worry about the lack of things to be said; there is some occasion for worry on the part of my auditors as to whether I may not keep them up all day and most of the night over some of the questions about which men are thinking at this time—such as embargoes and treaties and leagues of nations and tariffs and numerous other matters, all of which seem to cry out at least for discussion, if not for settlement.

So many of these questions are new, and there are strange responsibilities involved in them; and so many queer ideas are abroad that come as shocks to our old-time ways of thinking.

I was speaking in Carnegie Hall four weeks ago, and the chairman of the meeting happened to mention "Bolshevism" and it was applauded in the back of the house. "Ah!" he said, "there are some Bolshevists here;" and that was applauded. Then I got a letter, a curious long-hand letter, which gave me notice that the formal representative of the Russian Government did not represent anybody, but that he, the writer, was the regular representative of the Bolshevik Government, acting for Mr. Lenine and Mr. Trotzky in the United States. Now posters are beginning to be handed about—one, distributed in Plymouth, Mass., calls upon the males of that city to arm themselves, to rise and take by force, or, as the circular said, "Tear away from the hands of capital the things which belong to you."

It seems to me desirable for us to think of these things sometimes just as do the men who think and say them.

The Seattle difficulty was arranged by a "Soldiers and Workmen's Council." There was a true Soviet in Butte; and in the East there was another. I think we are within bounds in saying that three weeks ago there was a definite attempt—not so much at a strike, as at a real social revolution. In one city automobiles went through the streets carrying agitators who called out to the people to join "the revolution." It did not amount to much, but we should be making a mistake if we did not recognize that an effort was made, and is being made, to develop something like a social revolution in America.

That leads me to the conclusion that there is something the Government should do as quickly as possible, and that is, to remove as fast as they can be removed, every war-time restriction on anything we sell, on the price of commodities, food and clothes, or restrictions which make it more difficult to carry on the normal movements of commerce. We should as rapidly as possible get men to earning money. The Germans did us an unkind act in signing the Armistice at a time of year when the weather prevents outdoor work, a period which also coincides with the period of least labor on the farms of the country. We have, now, three main causes contributing to unemployment: (1) The return of so many soldiers; (2) the normal unemployment season of winter; (3) the unemployment caused by greater or less stagnation through waiting for things "to turn up."

Happily, the report which I received yesterday from the Labor Department asserts that there is, for the first time recently, a decrease of some thousands in the number of unemployed. But there has been a certain amount of it—not much, as compared with 1907-1908, but sufficient to give to these "apostles of deviltry" an opportunity to talk.

One of our young men who recently came back from Russia, after living through the entire revolutionary period, said, "Bolshevism is anarchy of mind based on an empty stomach." There is no question but that hunger is the basis of it, the basis of much of the social unrest of these times. A man just from Germany told me yesterday that he had not had sufficient to eat for two years. He had managed to get along, but that was all. He said that there lay in the lower strata of German society very serious elements which were suffering from insufficient nourishment.

If I am not mistaken, 30 per cent. of all the married women in Germany who bore children within the last year, died in childbirth, the result of insufficient nourishment. Such a condition finds its normal outcome in the Spartacide movement in Germany.

But, as I have said, three great causes are exerting their influence on our problem of unemployment; and it will be a few more weeks before the weather will permit us to resume outdoor work.

Have you ever reflected that you cannot run a republic solely by the wisdom of the upper classes? It cannot be done, although it has been tried. I use the term "upper classes" here in its generally accepted sense. What I mean is that the men like yourself and myself cannot alone run a republic. We have got to depend upon the common-sense of the common man. In the last analysis we must go to the men who have not had the opportunity for training, which fortune and the wisdom of our parents put into your hands and into mine. We must look for decisions in weighty matters, to the judgment of men whose training in judging and determining has

not been all that you and I would choose to have it. That means that we have to depend upon right feeling as well as upon judgment. We have to depend upon the right feeling of the ordinary man who has not had the opportunity for study, nor the chance to develop a trained judgment and trained discretion.

How does he feel? Answer me that question, and you will determine his action in large part; and in determining that, you will determine the action of our country in the coming days.

I think this conviction has grown upon me in recent weeks, as I have come in touch with the recent attempt at social over-turn in our own country, and it has brought with it a graver sense of responsibility on my own part.

What are we doing with the 14,000 men we have in our department? Are they human beings and do we treat them as such? Or, are they names on the payroll, treated merely as such? Are they numbers regarded only as such?

It is upon those 14,000 men and upon others like them all over this country, in the Islands of the Pacific and in Alaska that our future depends; and if this is true, I ask: "What is my relation to them?" What is my personal relation to these men? Is it sufficient for me to see that they get their wages—that their hours are those of the law, and that there is a normal and sufficient exercise of the executive supervision?

Have we done all when we have gone so far? And having gone so far, can we prevent something else being done? Can I prevent my own personal influence, for good or ill, my own influence for evil or for righteousness, sifting down through the mass to the bottom? Will not these men be guided in some small measure by whether they think the Secretary is on the level or is not so—by whether they think he is just or unjust—by whether they think his decisions are fair or not—by whether they think he regards them as human beings, or just as numbers or names? Therein comes the responsibility which no employer can escape.

How often have I seen the spirit that develops in great companies, with a just man at the head, strong, firm and, perhaps, on occasion, seemingly severe, where the idea goes down through the entire force that the leader is a fair-minded man doing the right thing. Whatever we are, so will be the influence which flows from us to the men and the women who work with us and under us. In some degree, as we are so shall they be. In some degree our ideals will become theirs. And their failure to reach their ideals will be reflected in their work.

I have come to think that there is small room for drivers in a republic; that is, what is called "discipline imposed from above" may well be replaced by leadership responded to from beneath. There lies in the hearts of all men and women, a normal response to leadership; they love to follow a leader; but there is no one here and no other self-respecting man who lives in our land, that does not hate to be driven. You may, or I, by discipline, get from him the filling-in of a certain number of hours with a certain number of motions, but the heart of the man or the woman is not in the work. It does not respond except to that which says "Follow." It will never respond if you say "Go."

In the blessed privilege of leading men and women, through the agency of work, to something better than work—that is, through work to a better expression of themselves, to that fineness of work which is true worship—there lies the

great opportunity in industry to-day. There are men whom you and I know, who ornament a company by their leadership; men of whom the force will say "The boss is fair and square. I will do it because I know he is square." And there are men who will say hard and cruel things in the places which they occupy for a time, and of whom hard things will be said and thought from below.

About ten days ago, I had a letter from a boy in trouble on "the other side," a sailor who had made a mistake. He wrote to me, "My father said, before he died, 'John, if you ever get in trouble, go to my old boss and he will be your friend.'"

Now, a thing of that kind is infinitely worth while. I have tasted of many things in life that seemed attractive; but to know at the end of years, that a man, who has since gone to his reward, believed that his old boss was fair and would have a kindly heart toward his troubled boy—that is a treasure worth having. And as the years go on toward the end of things here, gentlemen, there comes to me this sentence: The pleasures of life come and go, the gratifications of life pass away rapidly, but one thing stays, and that is the power to make men and women better, and to make life sweeter, and to make men happier because you have been in the world; and to make men have confidence in you because they believe you to be fair and honest and generous.

I beg of you to use this power, for the friendly influence which you can exercise in this way is one that will not only react in you, but it is a saving force to your beloved country.

The Future Sales Policies of the Gas Industry and Their Justification

JAMES P. HANLAN

IT is difficult at this time to predict accurately just what the future policies of the gas industry will be, but you gentlemen know perhaps better than any one else what they should be and upon you will rest the responsibility of their justification. In speaking of responsibility, I like to think of its close relationship to opportunity, and it is a pleasure to note that while the responsibilities of the men entrusted with sales development are greater to-day than ever before, their opportunities for constructive work were never so numerous. This statement and other observations and conclusions presented in this paper are based on information gathered in talks with gas men and through a survey of the sales activities of 1917-18 and the contemplated plans for 1919, made by means of a questionnaire. (See page 57, Feb. MONTHLY.)

During 1917 practically all gas companies actively solicited all classes of business, but towards the close of the year, owing to the demands made upon them by war and the unusually severe winter, many companies found it necessary or deemed it advisable to curtail the development of sales and to reserve the spare capacity of their plants for emergencies.

We notice as the first result of this necessity or policy, that many valuable

men and women were compelled to seek employment outside the industry. The apparent lack of permanency in sales departments acted further as a serious handicap in our attempts to attract the right men and women whose assistance we must have if the gas industry is to increase its business or even retain what it now possesses.

Furthermore it is most regrettable, that although 1918 offered the best opportunity we have yet had to increase the sale of gas to that large percentage of consumers represented by skilled and unskilled laborers, the gas companies whose trained sales forces no longer existed were in no position to take advantage of the greatly increased purchasing power of this class of customers. We, therefore, not only lost the increased revenue from gas sales, but also the profits which could have been made from the sale of the appliances themselves.

Next to food and clothes, no single commodity is more necessary for the comfort of the laboring man's family than gas. It satisfies a legitimate need which is frequently only half recognized. These families do not look upon a purchase of gas as upon a purchase of sugar. Gas beyond a certain insufficient minimum must be sold to them by active effort and the only way it can be sold is by placing in their homes the right gas ranges, water heaters, irons, fireplace or portable heaters, or modern gas fixtures that will furnish a better and a cheaper service than is afforded by other mediums.

To do this—to meet the competition of other fuel and lighting appliances, and to meet the problem presented by the type of gas merchandise sold by many hardware and house furnishing dealers—takes, at present prices, real sales ability. Once this fundamental is understood by those whose money is invested in gas properties and by others responsible for their management and future prosperity, sales departments will be considered just as essential to the gas business as the other departments are.

The future prosperity of the gas industry depends entirely upon the ability of managers to sell gas at a profit in competition with other commodities furnishing similar services. Nor is it necessary to sell gas appliances or do jobbing work for consumers at a loss in order to sell gas at a profit. It is, in fact, a duty of the industry as a whole to adopt methods that will not permit such losses. Some companies are doing this now and what some can do, all can do by following methods which every successful storekeeper has to adopt in order to stay in business.

The policy of getting as many gas appliances as possible on the mains, in the shortest possible time, irrespective of loss involved, is obsolete, in the days when every unit in each activity must contribute its share of profits to the business as a whole. Because it has been the practice in the past to make good from the profits on gas the losses, apparent or real, on merchandise and jobbing sales is no good reason for the continuation of such a practice. Among the best business men in the country to-day are the department store owners, whose success is largely due to their ability to make all departments contribute profits to the store as a whole. There are gas men who have spent large sums of money freely with no concern that results secured must be commensurate with the expenditure.

One of the first sales policies of the gas industry from now on should be to make its sales departments at least self-

supporting. This can be done partly by fixing the resale prices on appliances and jobbing work at an accurate figure that covers the cost of selling, installation, collection, accounting and all overhead expenses besides a reasonable profit on the transaction.

I purposely qualify this statement, however, for our selling prices cannot be made high enough to cover inefficient methods of buying, high costs due to poor salesmen or displays in our offices, losses due to unnecessary obsolescence or depreciation of material, cancellations which result from lax methods of delivery and installation, inferior workmanship or excessive installation costs, slow turn-over, improper analyses of markets with consequent failure to sell, and failure to balance costs against results.

Speaking of overhead expenses, it is necessary that some study should be made to determine what expenses can justly be charged against the sales department; our present system makes mistakes of both inclusion and exclusion, and a recommendation should be offered the industry as to the proper basis for making charges. Successful merchants and manufacturers in other lines have carefully standardized methods for determining the items of overhead expense to be included in the sales prices, but it is doubtful if two gas companies in this country, operating under different managements, have the same system for figuring such charges.

Before we leave this subject it may be well to remind gas company managers that they have previously enjoyed almost all the gas appliance business because of their favorable prices and terms of sale, that, while it is desirable for sales departments to be made self-supporting, our main business is to sell the maximum of gas at a profit; that we cannot expect to make the sales department self-supporting on a price basis alone; that if, when our prices are fixed to cover the cost of selling appliances on easy terms, we proceed to rearrange terms of payment so that they approximate the terms of a charge account, or if we give less service than those who can and will compete with us for the appliance business on a charge account, or even on an easy term basis, we shall not only lose part of the business which we now enjoy, but we shall also lose gas sales. Let us not forget that we want and must have volume business in our sales department.

The writer believes that some lack of co-operation between gas companies and manufacturers of gas appliances has resulted to the detriment of both. The gas company, however, has been the principal loser in normal times while in such years as the one just past, the loss has fallen most heavily on the gas appliance manufacturers who found themselves in a very awkward position when the gas company market to which they had restricted themselves failed them and they were forced to create new markets for their wares.

These manufacturers are now seeking information concerning gas companies' sales policies for the immediate future. I quote from the letter of one representative manufacturer:

> "It seems to me that the thing of most vital interest to the manufacturers who serve gas companies is, first, what the attitude of each gas company as to its re-establishment of its commercial department will be, and to what extent it will seek new business from undeveloped territories.
>
> "Secondly, if no general advances in present established rates are forthcoming, will there be any activity in 1919 over and above the inactivity that has prevailed in the commercial department of gas companies in 1918?"

Nine gas companies in replying to our

questionnaire stated that they plan to restore their sales department to the 1917 basis; two were undecided and two did not answer this particular inquiry.

Just stop to think in what position the gas industry would be to-day were it not for the inventive genius and resourcefulness of the appliance manufacturers. Manufacturer and gas company have both gone only part of the way and there is much to be done to make gas appliances more efficient than they are to-day. Manufacturers are willing to do their share, but they ask that gas managers give gas consumers an opportunity to purchase the highest grades of appliances. Manufacturers believe that some gas managers are inclined to under-estimate the ability of the customers they serve, to purchase high grade appliances. If so, this is quite the reverse of the policy followed by the dealers in other high-class merchandise in the same city or town. Some gas managers feel that the margin between the cost and the manufacturers' list prices on certain classes of appliances does not enable them to spend sufficient money to exploit the goods and yet make a reasonable profit.

Therefore, the writer believes that in asking for closer co-operation between manufacturers and gas managers, he is advocating a policy that will be of material benefit to both in solving these and other problems connected with the manufacture and distribution of gas appliances at a satisfactory profit for all concerned.

Every gas manager is interested in selling a maximum amount of gas each month throughout the year. A similar condition would be the ideal one in the sale of gas appliances. As it is now, many gas companies have valley periods in gas and in gas appliance sales. It is believed that these valleys in both cases can be partially or wholly filled by the right sales work.

For instance, there are many companies whose winter sales of gas are much below their summer sales, the exact reverse of a condition not uncommon years ago when some of us saw our summer sales fall below the winter record. The present condition is the result of consumers using less gas for cooking and water heating in the winter time.

Many gas men, believing that it is unnecessary to lose winter cooking business to coal, have put forth efforts to hold it, and have been very successful in substituting gas kitchens for coal kitchens in many homes. While this is a step in the right direction, it is only a step and if we are to get the maximum of the winter cooking load we have got to replace the coal stove more rapidly.

The writer believes that the way to do this is to offer, in houses not heated by furnaces, a type of range which is so constructed that it will heat the water, do all the cooking and furnish ample heat at seasons when the heat is necessary, at a total cost which will compare favorably with the cost of operating a coal range.

Gas men should approach this problem with an open mind. Although the writer believes that the gas kitchen is the ideal kitchen, he recognizes that there are thousands of homes where a gas kitchen is not the practical kitchen. Why, therefore, continue to lose the winter cooking sales in these homes by holding to an ideal? Why not sell these families a type of range that will, by merit alone, win the cooking for gas? By adopting such a policy we can sell much more gas in winter, and in the late fall and early spring as well. In fact, we can improve

our sales for all year round by placing at the disposal of these families a complete cooking service with gas as fuel, instead of the inferior service of hot plates, cookers, etc.

The profit on the sale of the range might be incidental, but it would represent a considerable increase over the present profit on the class of cooking appliances usually bought by the customers of whom we speak. We might also consider that if we do not push the sale of this type of range, other dealers will do so and we shall face a probability of supplying gas through an appliance which will render but an inadequate and unsatisfactory cooking service.

The fireplace heater as now perfected opens up almost a new field for the sale of gas for auxiliary heating and the writer believes that with the proper merchandising plans, as many gas fireplace heaters can be sold each year as gas ranges.

The way to improve and thereby retain gas lighting is to substitute in a *wholesale way* the newest types of gas reading lamps, domes, semi-direct fixtures and fancy wall bracket lights, for old style gas fixtures still in use in the homes of a majority of consumers. The writer believes that gas companies could cooperate with manufacturers to secure on combination orders, prices that would enable them to put on sales campaigns for gas lighting that would really retain many of our present lighting customers indefinitely. Gas companies could, undoubtedly, also add to their sales of fall, winter and spring commercial lighting by placing lighting units in stores, factories, etc., at a price which, while covering the costs of sale and maintenance, would yet be an attraction to storekeepers or factory owners.

If really big things are to be accomplished, new ideas and new methods of selling will have to be introduced in our sales development work. The department stores have shown us how they fill in their valleys by "White Sales," "Furniture Sales," "Housefurnishing Sales" or "Silk Sales." With the variety of appliances at our disposal we can easily have a sales stimulus every month of the year in conjunction with the "National Weeks," which have been so successful in the past few years.

One very essential policy which the writer hopes to see universally included in the activities of the sales departments of the gas industry, is the maintenance of appliances. No matter how modern or costly our gas works may be, or how adequate our systems of distribution are, or whether every room in every house is piped and every outlet in house, store or factory has a gas appliance of the latest type connected to it and our meters are registering 100 per cent. of the gas used, we may still fail to get the maximum of return on our investment, if we do not see that our customers get the maximum of service from their appliances. There is but one way to assure this result and that is for the gas companies themselves, as the ones who have most at stake, to keep all appliances at their maximum of efficiency by a regular inspection and maintenance service.

It is, moreover, the writer's opinion that gas companies are entitled to and should be paid for rendering this service to consumers. The latter cannot be expected to accept the idea at a first glance. In other words, the service must be sold to them and the merchandising features in connection with it must be properly exploited, for on them will depend, at least in part, success in making the plan self-supporting.

The last sales policy to which the

writer wishes to call special attention is the proper selection and training of sales representatives. I was glad to see that nine out of eleven companies answering the questionnaire favored the policy of employing only high grade men as sales representatives. Their experience has been that not only will fewer men be needed by a gas company, but that these men will make upwards of 50 per cent. more sales in any district than the representatives with only average sales ability.

The company whose policy it is to employ high grade sales representatives has men who can command the attention and confidence of any customer they serve. An analysis of the work of high grade salesmen shows that their sales are made in a clean-cut manner, and upon such sales the company makes the most profit. These men make friends for the company. Likewise, they are a reserve force from which capable men may be drawn to fill other positions in the industry.

These are only some of the sales policies which the writer believes should engage the attention of the "forward thinking" men in the industry. We must go forward—not backward. The standards of sales service and appliances must be kept up to our former high ideals. "The best men, the best methods and the best merchandise" should be our motto.

One thing we should all remember—if we wish to continue the merchandising of gas appliances, we have got to accept the responsibility. Don't let us consider the troubles incident thereto, but let us remember that the more appliances we sell the more gas we will sell.

We must hold what we now have at all costs, as this is the result of the work of the best years in the gas industry, and we must do our part in the reconstruction work of the country. It is a big job and unless you and I and all of us do something constructive in these critical days, the opportunity may pass from us.

The time for action has arrived—let us do something, be it ever so little. If everyone in the gas industry does his or her share, it will lend heart and encouragement to others less fortunately situated in the business world.

Reports and Discussions on Technical Subjects at Conference of March 13-14

THE following brief papers and discussions were in every case prepared on short notice, but likewise, in each case, they present the opinions or conclusions of men who have spent both time and thought in study and in practical contact with the problems concerned. Both the Chairman and the Secretary of the Technical Section urge its members to submit their comments and criticisms on the suggestions here made and the solutions of difficult problems here proposed.

Operating With Low Grade Manufacturing Materials

G. I. VINCENT (Syracuse, N. Y.)

The war period has brought about a marked deterioration in the quality of oil and other fuels used in manufacturing gas. While this is true of all fuels used, the writer's experience has been limited, during the period, to anthracite coal, gas oil, and bituminous coal for boiler fuel.

The quality of anthracite coal, measured from a fixed carbon standpoint, has depreciated at least 10 per cent. Furthermore, the coal also varies widely in analysis, physical structure, and size.

Oil has depreciated in the same ways, but there are no data at hand to express this depreciation even approximately; it can only be judged by the inability to secure results.

The fixed carbon content of bituminous coal for boiler fuel has probably fallen, on an average, 10 per cent., with the same wide variation in other qualities.

Efforts have been made to meet this very serious condition, but the fact that most plants have been running very close to their capacity, has proved a handicap since the trying out of any idea that was not practically certain to work was inhibited. The failure of any radical innovation under trial would, in most cases, have been disastrous. The shortage together with the high turn-over of labor, bringing about the employment of inexperienced operators, also seriously hindered attempts to solve the problem.

It is highly probable that the quality of anthracite coal will not improve in the immediate future, if at all. It is possible that gas oil will ultimately be better, but the near future promises little change. It is probable that there will be a continuous improvement in the quality of bituminous coal from now on.

The use of low grade anthracite coal has its greatest effect on the capacity of the plant and as early as the beginning of 1917 it was realized that this matter was becoming serious.

The first idea, which was tried after careful study of the whole problem and which is still in successful use, put the fire cleaning on piece work and secured an average of one hour in twenty-four more running time on the active water gas sets. As worked out, the plan is comparatively simple. A fixed number of men constitute the cleaning gang and they are paid so much per clean. The price was fixed high enough to attract and hold men during the high common labor competition. On the cycle which has been used there are two cleans per set in twenty-four hours. The method automatically takes care of itself because a slighting of one clean will make the succeeding clean harder.

As the quality of anthracite continued to depreciate a further innovation was made by designing and installing a machine for more rapidly removing the side wall clinkers. This was put in use early in 1918 and, speaking generally, has prevented an increase in cleaning time as the fuel has continued to depreciate. This, of course, helps to save the first idea of the piece work cleaning.

The device consists of a 600-pound bar, with a wide chisel point, carried at its center of gravity in a stirrup by a cable running over a permanent pulley over the coal hole branch of the generator. The cable is attached to a manilla rope that runs to a small electric driven hoist, around the winch head of which it passes three times. Five men are required to handle the rope behind the hoist and two men to steer the heavy bar—a total of seven men for the entire cleaning gang. Tightening the rope causes the hoist to lift the bar to any desired point and loosening the rope allows the bar to drop by gravity. All water gas operators are aware that a heavy intermittent blow is more satisfactory for removing clinkers from the side wall than a large number of lighter blows, such as would be given by a rock drill. This device will remove the bad side wall clinkers from an 11-foot generator in an average of twelve minutes running

time, and is no harder on the side wall lining of the generator than the old method of clinkering. It is, however, harder on the lining of the coal hole branch which has to be watched and repaired at more frequent intervals.

All that has been done to offset the falling quality of oil is to change the checker brick at more frequent intervals.

The variations in generator fuel and oil have, of course, caused wide variation in the quality of the finished gas. At times, we faced the even more trying condition of being unable to secure at all the standard quality of finished gas with the low grade of materials available. The need of a satisfactory recording or continuously indicating calorimeter was very apparent.

Boiler Fuel Conditions

In plants that had already been brought up to a high state of efficiency of steam generation and utilization, little could be done to meet the depreciation in boiler fuel. The conditions have brought home, however, the possibilities of improvement. The literature on the subject is extensive, but much of it is highly technical and it is probable that the operators of gas plants of medium and small size have been discouraged. Then, for example, the great amount of material on the subject of the proper hand firing of boilers has been only an irritation because, during the past two years real firemen could usually not be secured at all. The value of good firing should not be disparaged, but, as a matter of fact, the difference in efficiency between a very good and a very bad fireman would be small in proportion to the difference in efficiency between a very clean and a very dirty boiler. And it is entirely possible to have clean boilers.

Most of the possible improvements in steam production simply follow lines of good common sense and can be applied at small expense in nearly every location. There are inexpensive instruments on the market, for which home-made devices can be substituted, if necessary. If the following rules are followed, the units will give pretty close to their maximum possible efficiency.

The feed water must be hot (200° to 210° F.) and treated so that scale will not be formed in the boiler.

The fire surfaces of the boilers must be clean.

The firemen should be the best that can be secured. Inexperienced men may be trained on the ground. It is possible to do this now, although it was not possible during the past two years.

The boiler settings must be tight and well insulated.

The draft must be controlled, automatically if possible, or by hand with suitable dampers. Draft gauges, although inexpensive, are essential.

Inexpensive Orsat apparatus which any intelligent workman can be taught to use, will give the final check on combustion.

In steam utilization the same dictates of good common sense must prevail. The following are suggested as helpful.

Eliminate all steam leaks.

Cover all piping, pump cylinders, traps, etc., with good quality of insulating covering.

Use no live steam for any purpose where exhaust steam can possibly be used.

Return the live steam trap discharges to the feed water heater.

Examine all prime movers at regular intervals to see that there is no waste of steam.

Run no idle units at full speed if they can be stopped or the speed lowered.

Make a steam survey of the plant to see that all the steam generated can be accounted for and that all the utilization is as economical as could be expected with the units employed.

In all this discussion of steam produc-

tion and utilization it is assumed that the equipment in use will continue to be used. There is frequently the possibility of greatly increased economy by the improving or replacing of installations. Certainly no additional steam producing or steam using unit should be installed without a careful consideration of its efficiency.

The Purification of Gas

The purification of gas presented a serious problem with the increasing necessity for accepting coal high in sulphur content. Both liquid, or wet, and heat purification processes have been tried with degrees of success.

O. B. Evans (Philadelphia, Pa.)

Liquid Purification

During this winter an opportunity was presented to me to secure some first-hand information regarding liquid purification of gas, through consultation with the Engineer of Tests of the Atlantic Refining Company (which you all know is one of the largest of oil refineries) in the removal of sulphur from the gases coming from their oil stills and containing as much as 8,000 grains of hydrogen sulphide per 100 cubic feet of distilled gas. This gas is composed of hydrocarbons mixed with some air and will run as high as perhaps 55 candles. The tests were conducted in a careful and scientific manner, and a description of the apparatus used and some of the findings and difficulties encountered may be of interest to any one who is seriously considering the application of liquid purification to illuminating gas.

The installation consisted of two towers 3 feet in diameter by 30 feet high, each filled with 136 cubic feet of 3-inch helical brick, made of a glazed earthenware, in the form of a cylinder 3 inches in diameter and about 3 inches high, with an interior helix. Each tower was placed above a 1,500-gallon tank, 7 feet in diameter and about 6 feet high, in which its lower end was sealed. These tanks were filled with a mixture of iron oxide and water which was pumped to the top of the first tower and sprayed down against an ascending current of gas. The foul oxide leaving the base of the first tower was then pumped into the top of the second tower and allowed to flow down against an ascending current of revivifying air. From the tank at the base of the second tower, the revivified oxide was pumped to the top of the first tower, thus affording a closed circuit in which the oxide was alternately fouled and revivified. In order to prevent the settling of the solid matter, centrifugal pumps were used. The piping was designed to insure a rapid flow and all sharp turns were eliminated. The iron in the mixture in the tanks was prevented from settling by air agitation, which later became the only source of air for revivification.

It was soon evident that the ability of a single tower to revivify oxide by blowing air through it had been considerably over-estimated and in subsequent experiments the two towers were used in series for purification, the revivification of the oxide being accomplished by the air used for stirring. The fact that iron oxide in supension appears to purify gas as readily as does iron oxide in the dry state when mixed with shavings, whereas the revivification of the liquid oxide is much more difficult than the revivification of the iron shaving oxide, may be explained by the theory that in liquid purification the hydrogen sulphide is absorbed from

the gas by the water and from the water by the iron oxide. In revivification, the oxide of the air acts directly upon the iron sulphide. When the sulphide is dry the air has free access to it, but when it is suspended in water, the water tends to exclude the air.

Simple scrubbing with ordinary water will remove considerable hydrogen sulphide, but the oil company was anxious to obtain a gas which was practically free from sulphur. For this reason they experimented upon the iron oxide and calcium hydrate. The conclusions which they arrived at were that iron oxide was more effective than calcium hydrate and that a 3 per cent. solution of iron oxide was about as concentrated as could readily be handled.

The general method of conducting the tests was to maintain uniform throughout any one test the quantity of gas and the rate of pumping, determining the sulphur content of the inlet and outlet gas. The test was continued until the oxide was fouled, this point being determined by a rapid increase in the sulphur content of the outlet gas. The oxide used was a precipitated one containing 24 per cent. of moisture and 41 per cent. of Fe_2O_3 on a dry basis, and when completely fouled it contained on a dry basis as much as 89 per cent. of free sulphur and only 7 per cent. Fe_2O_3. The quantity of liquid circulated through each tower varied from 36 gallons per minute to 90 gallons per minute; the sulphur content of the gas, from 8,000 to 700 grains per 100 cubic feet and the quantity of gas, from 2,000 to 8,000 per hour.

As an example of the results obtained it was found that when passing 4,000 cubic feet of the 2,100-grain gas per hour, using 70 gallons of liquid per minute through each tower, the hydrogen sulphide was reduced to 132 grains per 100 cubic feet. The general conclusions arrived at by the engineers of this company were:

1. The cold liquid purification of a very high candlepower oil gas may result in a loss of 25 per cent. in candlepower, and with a lower candlepower oil gas, a loss of as much as 6 per cent. However, if this gas is purified at a temperature of about 130° F., the loss in candlepower will be not over 2 per cent. It is possible that the loss in candlepower by the liquid purification of the ordinary illuminating gas would be even less than 2 per cent. at a temperature of about 90°.

2. A given apparatus under the same conditions will remove a constant percentage of the sulphur present in the crude gas, whether this gas contains 8,000 grains per cubic foot or 700 grains. It is believed that this same relation will hold good with gases containing a lower sulphur content.

3. In a liquid purification apparatus built with two similar towers in series and so operated as to remove 95 per cent. of the sulphur in the crude gas, the first tower will do 93 per cent. of the work.

4. When completely fouled, the oxide may contain as much as 89 per cent. of free sulphur, which should make it of value for the production of sulphuric acid.

It would seem as though the main difficulty to be experienced in the liquid purification of illuminating gas would be in the revivification of the oxide and the possible loss in candlepower where candlepower is of vital importance. The sulphur removed should be in a form suitable for conversion into sulphuric acid and should be a valuable by-product. The chief operating cost is the pumping of the liquid.

We have been accustomed to considering iron oxide as the purifying agent, but we must remember that the early history of purification contemplated the wet process, with "Blue Billy" as a by-product. Wet purification may recommend itself to certain companies because of favorable local conditions, particularly where it would be easily possible to install a wet purification system ahead of a dry box system, in which a great portion of the sulphur would be taken out by the wet purification system, leaving the other as practically catch boxes. Some companies may even have their minds on the "debenzolizing scrubbers" at the inlet to the purifying boxes as a possible method of experimenting in this line.

W. H. FULWEILER (Philadelphia, Pa.)

Hot Purification

To reduce a fixed sulphur content running at times up to 40 and 45 grains per 100 cubic feet, in the coke oven gas which we distribute at Harrisburg, a hot oxide purification system was installed. The gas, after the removal of the hydrogen sulphide, is heated by passing it over steam coils (using superheated steam) at about 450° F., and then passing it over a very active iron oxide. This results in breaking down the carbon bisulphide, forming hydrogen sulphide, which is removed by another box.

Owing to the fact that the coke oven gas is delivered at times in very large quantities, it is not possible to treat it all with this apparatus, so that a part only is handled. We find that we can reduce the fixed sulphur compounds down to about 9 grains per 100 cubic feet in the gas treated, which results in holding the total sulphur in all of the gas below 20 grains.

In experimenting with the process in the laboratory, we found that it was possible to reduce specially prepared samples of gas containing 3,000 grains of fixed sulphur compounds, to 11 grains, whereas, starting with 30 or 40 grains, we could only reduce it to 9. This would seem to indicate that there is either a state of equilibrium or that the remaining 9 grains are not carbon bisulphide.

We have made some experiments which indicate the presence of mercaptans and possibly some others, and these compounds probably do not react readily with iron.

With reference to liquid purification with ferric oxide, we found that if we could take the foul oxide out of the solution it revivified very rapidly. The slowness of the action in solution is apparently due to the very low solubility of oxygen in water.

Mr. Forstall introduces the question of lower temperatures by quoting the French engineer who claims that at 100° C. he can take out 75 per cent. of the organic sulphur compounds by passing the gas through iron oxide.

Carbon bisulphide reacts with iron oxide to a very slight extent, even at the ordinary temperature. This reaction increases as the temperature rises, very slowly at first and then rapidly from 350° up to 450° F. Our experiments did not indicate that there was sufficient reaction at 212° to make the process commercially possible.

"What Can Be Done With Existing Light Oil Plants?"

W. H. FULWEILER

(The following paper was prepared under the direction of the Chemical Committee of the American Gas Association, and is based on a summary of replies to a special questionnaire.)

As a result of the insistent demand for toluene as a raw material for the manufacture of high explosives, over fifty plants for the recovery of this hydrocarbon from illuminating gas were built during the war period.

Of these a few were constructed by the gas companies on their own initiative, but by far the greater number were built by the Government, as a part of the Ordnance Department's production program, under a contract governing their installation and operation, which generally provided that the Government should remove the plants from the gas companies' premises within one year after the termination of the war, if the gas company decided not to purchase them, in whole or in part, according to the options granted.

These toluene recovery plants, built under high pressure with labor and material costing from 100 to 300 per cent. above what we have hitherto considered the normal figures, represent the investment of many millions of dollars and the Government and the gas companies are now confronted with the question of what use can be made of them.

It would appear to be the duty of the gas companies thoroughly to consider the problem of the economic utilization of the plants as it relates to their local situations so that they will be in a position to assist and to co-operate in every possible way with Government agencies charged with the affair, to the end that the Government may be able to dispose of these properties in the most advantageous manner.

It has been the generally accepted opinion that these recovery plants, like thousands of others erected by the Government as part of the war program, were war necessities constructed to meet an emergency; that this emergency has now passed; that they have fulfilled their mission and should now be scrapped and removed without further delay.

It would seem, however, to quote from one letter, "almost an act of vandalism to destroy the beautiful plants erected for light oil absorption" and yet their sheer mechanical beauty and perfection will not of itself pay taxes, interest or maintenance charges, and it was felt that it was our duty to make a concerted effort to determine whether there did not exist some profitable use for equipment that at the most favorable scrap figure would probably bring but a small fraction of its original cost. In some cases the cost of removal and restoration of the land might even exceed the scrap value.

So far as concerns the continued operation of these recovery plants for their original purpose, *i. e.*, the production of benzol, toluol and solvent naphtha, it appears to be generally agreed that this is a commercial impossibility in a situation manufacturing illuminating gas, owing to the facts that the existing production of light oils from coke oven plants greatly exceeds what is generally assumed to be the normal requirements of the country for these products, and there has been a correspondingly great increase in those countries that might have been looked upon as possible markets for export.

The Government seems tacitly to have assented to this view inasmuch as the operation of the Government works was stopped almost immediately at the signing of the Armistice.

The continued operation of the plants for the production of a partially refined light oil for motor spirits has received a great deal of attention recently, especially in England. It is very difficult, however, accurately to compare the situation as it exists in England with the situation in the United States, because of a very considerable difference in statutes, in the market for motor fuel and in the local distributing requirements and conditions for this commodity.

The use of certain portions of the apparatus as extensions to the existing facilities of the gas company has been frequently suggested, but this obviously is a matter which would depend purely upon local circumstances and conditions.

In order to assist the industry in general to a solution of this problem and to develop any new or possible uses to which these plants might be put, the Chemical Committee of the Association directed the writer to send out a questionnaire to the various gas companies operating recovery plants, asking for their views as to the economical utilization of the plants on their properties. Inquiries were addressed to thirty-one companies operating fifty-four plants. Twenty-three replies were received from companies representing forty plants—twenty-eight Government and twelve private. As it was agreed in the questionnaire that these replies should be confidential, a summary only of them will be given.

No company believed that the plants could be operated as such.

Eight companies felt that they possessed no possible commercial use in their situation and that they should be scrapped and removed promptly; in a number of cases the land was required for normal works operation.

One large privately owned plant is already partially dismantled.

Four companies with uncompleted plants did not believe that they should be completed.

Eleven companies had considered the production of a purified light oil for motor fuel. Three privately owned plants are already producing such material, and two of them are very doubtful as to the ultimate success of the project.

Seven companies have decided that in their local situation it will not be profitable to produce motor fuel. It might be noted that of these, several are operating on a heating value basis.

Three companies are doubtful.

Nine companies believe that it might be possible to utilize the scrubbers and perhaps some of the pumps for scrubber condensers. Three companies cannot utilize them for this purpose as they are not suitably located and three companies are already provided with sufficient capacity.

Nine companies believed that the stills could be used for dehydrating tar; three companies either did not dehydrate tar or did not believe this feasible under their conditions.

One company believed that one still might be used as an ammonia concentrator, another company could utilize the scrubbers (which were of small diameter) as emergency storage capacity on one of its high pressure lines. One company suggested that possibly a portion of the apparatus could be adapted to liquid purification.

One company felt that in view of their very small scrap value, the Government

should leave the light oil plants as they are, paying the gas companies rental for the land on which they are situated, making the respective gas companies custodians of them and thus keeping them intact for an emergency, as an arsenal is kept. One company felt that the plants should be kept intact for a time to determine more definitely how the motor fuel situation would develop.

It must be confessed that these replies did not offer any very definite solution for the problem, especially for the Government plants. In addition a number of the gas companies pointed out that only a very low figure would enable them to purchase even portions of the apparatus for use as washer coolers, etc., since allowance must be made to cover the cost of changes that would be necessary to adapt the apparatus to its new use.

In view of the foregoing, it might not be out of place to consider some of the conditions under which these plants would have to operate in order to make the production of light oil under our present conditions commercially possible.

We may at the outset eliminate those plants that must operate under an illuminating value standard, but we can consider a water gas plant operating under a heating value requirement of about 575 B. t. u. Such a plant could probably operate with the use of 3.2 gallons of oil per 1,000 cubic feet and would require, when scrubbing, the use of 0.4 gallon of extra gas oil or a total of 3.6 gallons per 1,000 cubic feet. There would be recovered approximately 0.36 gallon per 1,000 cubic feet of light oil or there would be required 1.11 gallons of extra gas oil for each gallon of light oil produced.

This gallon of light oil would probably yield:

0.75 gal. crude benzol	@ 13¢	9.75¢
0.15 gal. crude solvent	@ 10¢	1.50¢
0.05 gal. residue (as tar)	@ 3¢	.15¢
Total credit		11.40¢
1.11 gal. gas oil	@ 7¢	7.77¢
Difference		3.63¢

This 3.63¢ would have to cover the cost of all supervision, labor, steam, water, wash oil and other supplies, interest, depreciation, insurance and maintenance.

Let us assume again that the light oil is to be partially refined and sold as motor fuel. There would be required for the washing of the light oil, probably 1.5 pounds of sulphuric acid and 0.06 pound of soda.

This gallon of light oil would probably yield:

0.55 gal. motor spirits	@ 25¢	13.75¢
0.15 gal. solvent naphtha	@ 12¢	1.80¢
Total credit		15.55¢
1.11 gal. gas oil	7.77¢	
Acid and soda	1.15¢	8.92¢
Difference		6.63¢

This 6.63¢ would have to include in addition to the costs mentioned before, the washing and all costs of another distillation, the storage, barreling or delivery by motor truck to the distributors.

It would appear to the writer that the following facts must be borne in mind in considering the possible utilization of light oils recovered from illuminating gas in competition with gasoline for motor fuel.

(*a*) The raw material for the oil refinery comes from the ground and costs the refiner only the winning and transportation to the refinery; the light oil costs the gas company about 10 per cent. more than the price of gas oil and in

addition, the cost of extraction, which, in the writer's opinion, will usually exceed the cost of winning and transporting crude oil.

(*b*) With the exception of certain special cases where an extraordinarily favorable contract can be made with a distributor to take all of the output (and he will require a fair margin for his service) the gas company must do as much work, and probably more, on its light oil to deliver it as an acceptable motor fuel as the oil refiner does to his gasoline—that is, the refining will include several distillations and a washing, storage, barreling or transmission to the distribution station and maintenance of the distribution station—with the advantage all in favor of the oil refiner in that these operations are conducted on an enormously larger scale.

(*c*) While the aromatic motor fuel may give a higher mileage per gallon than gasolene, it appears that gasolene and straight aromatic motor fuel cannot be efficiently utilized interchangeably (*i. e.*, without carbureter adjustment), although mixtures of gasolene and probably not over 30 per cent. of aromatic compounds apparently can be so used.

This fact may hinder the use of aromatic spirits for pleasure cars and tend to restrict it to trucks and other vehicles making relatively short runs where they can always return to their home stations for supplies. Certain minor changes such as coating the cork floats with water glass, or their replacement with metallic floats, and a considerable advance in the ignition point, must be made to secure the most efficient utilization of the aromatic motor fuel.

Conclusions

It would seem in view of all of the foregoing that the present opinion regarding the utilization of light oil recovery plants is about as follows:

1. The recovery plants have no going value as such, owing to the fact that the coke ovens are apparently producing in excess of the country's normal requirements.

2. Where the equipment is owned by the company and has been, presumably, written off, it may be possible to produce a motor spirit for purely local consumption at a small profit.

3. In the case of about one-third of the Government plants, portions may be utilized by the local companies for washer coolers, tar dehydrators, tankage, etc., but the value of this apparatus would depend upon local conditions, and would probably not greatly exceed the scrap value.

4. In the case of the remainder of the Government plants, there seems no commercial use for them and they must be scrapped.

W. H. EARLE (Rochester, N. Y.)

We have been scrubbing our mixed gas since July, 1917, and almost immediately after the signing of the Armistice we decided to convert our light oil plant into a motor fuel outfit. We make a mixed gas, 60 per cent. of which is coal gas, and we have changed the plant so that we can scrub coal gas only, for motor purposes. We put in the necessary refining apparatus and the plant has been in operation about a month. I have no figures available to show the production costs, but we are optimistic as to the possibilities. We are scrubbing rather less intensively than we were, in an effort to leave in the gas some of the higher boiling oils; consequently we are decreasing the heating value by only 2 or 2.5 per cent.

Our figures on refining are somewhat lower than Mr. Fulweiler's. We seem to require only ⅓ pound of sulphuric acid and only about 1/10 pound of caustic soda per gallon of light oil. We are getting a yield of about 75 per cent. of our crude light oil in motor fuel; about 20 per cent. of it is returned as a residue, and the actual loss is only about 5 per cent. The demand for motor fuel in Rochester is large enough so that our 1,000 or 1,200-gallon production per day is only a drop in the bucket. We use about 200 gallons in the operations of our own company. We mix it with about 25 per cent. of gasoline, to reduce the freezing point in cold weather from its normal +30° or 40° F. to —30° F.

In the tests made, which corroborate those by the Government and other organizations, we find that the mileage has increased from 50 to 70 per cent. in favor of the motor fuel as against gasoline, and has increased in all makes of cars, not less than 10 per cent. This motor fuel is particularly efficient in motor trucks.

We are now campaigning for the sale of our product, especially among the motor truck users in the city and I believe we can get a very attractive price for the material.

Disposal of Waste from Gas Plants

R. B. Brown (Milwaukee, Wis.)

Our chairman has given me a subject with vast possibilities and many ramifications. I believe, however, that I was asked to discuss certain phases in connection with the contamination of a public water supply by gas works, coke oven and similar types of wastes.

In times past, as you all know, the elimination of oil and tar from the liquid effluents from gas plants has been considered satisfactory. Occasionally where the effluents left the plant at high temperatures, they had trouble from odors, but such troubles as they recognized came only from tar and oil.

For thirty years or more the underlying causes of typhoid and intestinal troubles, as affected by water supply, have been well understood; but it is only in recent years that sterilization of potable water supply, by chlorination, for example, has been adopted. I understand that three thousand plants are now chlorinating water supplies. Even under this treatment a very powerful taste and a medicinal odor, like iodoform, may at times be noticeable.

Such a taste and odor spread in the water supply of one of our large lake cities. After experiments including the chlorination of the waste from every industrial plant in the city, evidence pointed to the gas and coke oven works as the source of the trouble. But the pollution proved to be far beyond anything that could be attributed to these, and the source of the trouble was eventually found in a Government phenol plant some 13 miles away. However, at the time, many things in the gas plant wastes which had not been particularly noticed before, were discovered. In the ammonia still waste, there were minute traces of pyridine, naphthalene and phenol. It was discovered that 1 part of crude phenol in 500,000,000 of clear water, when chlorinated with 3/10 parts per 1,000,000 chlorine, would produce a taste in the water, making it unusable for drinking or cooking purposes.

This trouble has probably occurred at many points both abroad and in this country. In England they have recognized that certain gas products, or waters

contaminated by them to a slight degree only, cause such effects. In this country, I do not think it has been generally known.

It then became a problem to eliminate these minute traces from the water. We are making some progress. It has been found that an ammonia still waste carrying these elements in minute quantities can, by filtration and ozonation, be cleared of the last trace. The process is effective but expensive.

It is also known that there are certain types of bacteria, "bugs," that will eat phenol and thrive on it. It seems that we shall evolve a combination of filtration with bacterial aid that will solve our problem. We have found that the phenol can be driven off from ammonia still waste by boiling to make it ineffective in ordinary dilutions. This is done by piping it to the coke quenching troughs, where it impinges upon the hot coke. This and dilution in the main volume of the quenching water, relieves it to a large extent. This, however, can be but a temporary relief and the bacteriological suggestion seems to be the one we must consider, for where our water effluent goes into a stream or water shed from which potable water is taken, we must make it absolutely safe. I agree with Mr. Klumpp, that a sub-committee of the Chemical Committee may well be appointed to investigate the whole problem.

C. J. RAMSBURG (Pittsburgh, Pa.)

It has been our experience that, in attempting to take care of the waste from ammonia stills by using it in the coke quenching water, the evil day is only being postponed. The chief difficulty with running still waste into streams is that the amount of phenols present even in a tremendous dilution gives the water a decided taste, which is described as "medicinal." This is increased enormously when the water is chlorinated as is customary in city water supplies at the present time.

When the water is used to quench coke the phenols are driven off into the air and there is every reason to believe that they deposit on the grass and trees of the neighborhood surrounding the gas or coke plant and eventually become so abundant that on the occasion of a heavy rain the water sources are polluted.

It is apparent that where the still waste flows into tidal waters not used for drinking purposes, there is little nuisance encountered, but where the coke and gas plants are located above the sources of water supply for other cities and towns, the phenols must be permanently taken care of.

The laboratories of The Koppers Company have been working on this problem for a long time and at present we believe we have found a method which may be practicable. It consists in filtering the material through two raw products; the resulting liquor has all the phenols removed. We hope in the near future to be able to have this so perfected as to make it applicable to plants where such difficulties are met.

(At this point, Mr. J. P. Kennedy of Cambridge, Mass., cited a case where a city sewer disclosed circumferential laminations of very fine particles of lime which were carried in suspension with the waste water for nearly 500 yards. The sewer was blocked up with this tissue-like scale formation which came from the line from the gas company's concentrator and no simple means to filter it has yet been found.)

The Disposal of Waste Water from Water Gas Plants on Streams Adjacent to Parks

L. R. Dutton (Jenkintown, Pa.)

These remarks will apply, not to streams where the waters are potable, but to small streams where the water, usually clear, changes its appearance and is rendered offensive by tar and oil from the water gas plant waste.

Gas works are often so located that operators do not recognize that unusual care should be observed in the disposal of the waste water. Unfortunately this condition may give rise to complaint before the accumulated results of neglect are noticed by those responsible for it; and steps for improvement of the condition become immediately necessary because of the enforcement of some governmental regulation.

When ordinary sewage is discharged into a stream, the solids disintegrate, oxidize and gradually dissolve; and their effects, both apparent and actual, show less and less.

The waste from a plant producing enriched water gas is suspended matter of an oily and tarry nature, dark in color, insoluble in water, and possessing a tendency to deposit on the shore or banks of a stream in the form of a shiny coating, constantly increasing in amount. With the recognition of the characteristics of the waste to be treated, disposing of it becomes a much more simple task.

We give herewith a description of a plant to clarify successfully the waste water (1,000 to 1,500 gallons) required for an enriched water gas plant producing 1,000,000 to 2,000,000 cubic feet per day.

The water should run to a settling basin, relief holder, or other receptacle, where it has the opportunity to cool and deposit the heavier tars by condensation; it may then flow by gravity, or be pumped into a concrete basin constructed especially for the final treatment.

The concrete basin should be not less than 24 feet long, by 16 feet wide, by 6 feet deep, with a partition through the center and a series of baffles that provide four basins. In Fig. 1 these are designated as follows:

A, *A'*—Inlet and settling area.
B, *B'*—Coke filter.
C, *C'*—Sedimentation area.
D, *D'*—Sand filter and outlet.

Basins *A*, *A'* and *B* are separated by baffles which retard the saturated water as it flows under and over them and thus produces a separation of the heavy tar.

Space *B'* is filled with about 5 cubic yards of coke and coke breeze and *D'* with about 5 cubic yards of pebbles and sand. These substances are placed on wooden trays (similar to purifier trays), thus allowing the water to come in full contact with them without obstructions.

The trays of coke breeze are about 6 inches from the bottom of the basin and the coke scrubs a large percentage of the remaining tar.

The water then passes through a narrow waterway, cut in the division wall, into area *C*. During its passage through this channel the water is saturated with a small quantity of aluminum sulphate, or commercial alum, in a precipitating solution (10 pounds of alum to 50 gallons of water) which drops from a barrel fitted with a small L. H. cock, to regulate the flow.

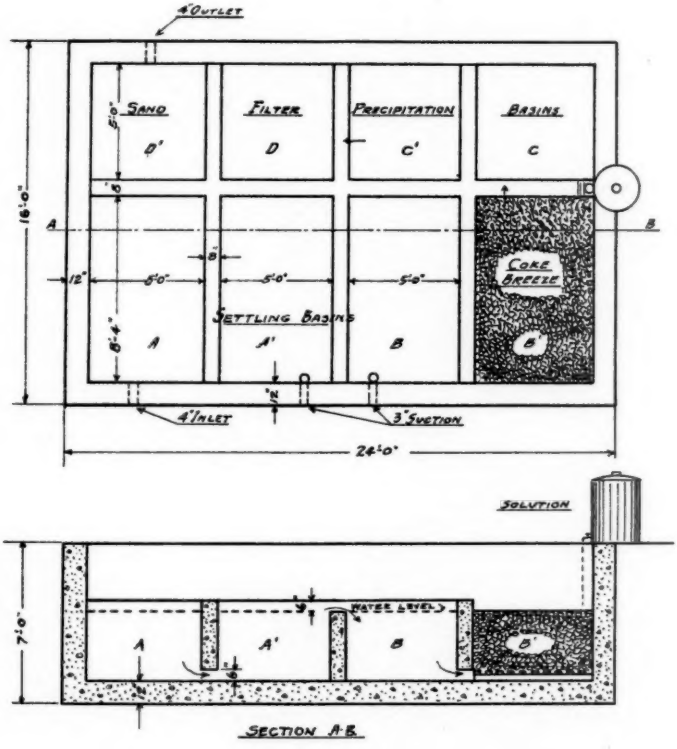
Baffles retard the liquid as it flows into *C'*, *D* and *D'* (filled with pebbles and coarse sand), and from *D'* an outlet

admits the water into a running stream. Scarcely a trace of color or oil is noticeable on the surface of the stream.

Water for recirculation to the seals may be taken from the basin by means of a suction line to the middle of *A'* or *B*; and a suction line to the bottom of *A'*, *B* and *C'* may be used to pump off the tar and oily emulsions deposited.

This disposal plant has been in operation about four years with entire success, and may readily be expanded by the addition of another basin, which cost, when built, about $300.

I have a little bottle of clear waste water taken from our plant yesterday when I came away. The filter substances in the basin had not been changed



The cost of operation per month is as follows:

1 cubic yard of sand	$2.00
5 cubic yards of coke breeze	3.00
Labor, pumping and cleaning	6.00
300 pounds aluminum sulphate @ $0.05 per pound	15.00
Total	$26.00

Or an average cost of less than $1.00 per day.

for three weeks. This is the average color of the water as it leaves the filter. On the bottom, you notice a slight emulsion showing the effect of the solution in separating the globules of oil; the final appearance is the same as the average sewage waste. The oil absolutely disappears in its passage down the stream.

There is one more interesting side light on this subject: after we had gone to the trouble of eliminating the oil and tar from the stream, we met a difficulty not at all anticipated.

Very near our works and about ten years after they were installed, an artificial ice plant was erected. The owners proceeded to dig artesian wells and found water of an excellent quality, and ample quantity which they used for three or four years with no evidence that we, their neighbors, would cause them any trouble. In the early days of the gas plant, the tar waste from the works had leaked through broken pipe lines and from the wooden separator box used for waste disposal. The tars seeped through the ordinary fissures of rock into the ground around the well casing, and traces of oil began to appear in the well water. Needless to say, there was very serious trouble for a while and it is possible that other plants are storing up, unawares, difficulties of the same kind.

ARTHUR HEWITT (Toronto, Canada)

I wish just to express a personal appreciation of this paper. In Toronto the effluent from our water gas plant has been running into the Toronto Bay since 1877 (when the plant was installed), but this year it had to be eliminated. The method described in Mr. Dutton's paper is the method we adopted. At one time we ran the effluent into a low-level intercepter, and complaint was made, that the bacteria in the sewage disposal plant were being killed. Mr. Dutton's paper is, therefore, to me very interesting. As time goes by, the matter becomes more important; for while, as I had said, we have had, since 1877, a pipe of our own conducting the waste into the Bay, there were complaints from the owners of boats that their craft were being damaged by this effluent. I was summoned before the Harbor Commissioners, who showed me thirty-five sample bottles of the liquid complained of. But the day before I appeared, we had connected into the low-level intercepter and they had nothing to say. We could not have done this, had it not been for the installation of settling tanks such as have been described by Mr. Dutton, which so clarified the waste water as to remove any objection to its being run into the sewer.

The Dehydration of Tar by High Tension Electricity

F. W. STEERE (Detroit, Mich.)

(The Conference was fortunate in having two papers prepared upon this subject, the other of which, read by Mr. A. F. Meston of the Research Corporation, N. Y., may be printed at a later date.)

I feel that, in self defense, I must make some explanation in presenting this paper. The matter was first brought to my attention some two weeks ago, at which time I consented merely to outline the topic for discussion.

I immediately wrote to all available sources of information on the subject, and also wired to some of the concerns in California where the high tension electrical process is being used in the dehydration of crude oils. Up to this date, I have been unable to obtain definite information from any one of these sources, due undoubtedly to the slowness of mails, etc. The subject will, therefore,

have to be discussed from the standpoint of its possibilities, rather than from any experimental work which has been actually done.

So far as I can determine, there have never been any successful results from experiments on electrical dehydration of tar. My own experience along these lines is limited to one series of experiments, conducted on coke oven tar carrying approximately 8 per cent. of water. The mechanical arrangement of the dehydrator was similar to that utilized in the dehydration of oils, as shown in the various patents which have been granted on this process. Voltages all the way from 10,000 to 50,000 were tried. The results may be summed up as follows:

Owing to short circuits forming through the tar and over the surface of the tar, it was not possible to keep the process in continuous and satisfactory operation. There was no evidence of any separation of the water from the tar. The experiments were discontinued as they did not seem, at the time, to lead to any practical solution for the problem of dehydration of tar. These experiments, in my opinion, are by no means conclusive and should not influence any proposed further investigation.

Any process that is to have a general commercial application must not only perform its service with more economy than existing processes, but must depend upon apparatus of a design and character that can be understood and operated by the average employee in the industry which utilizes it. Generally speaking, gas plant operators are not fitted either by experience or training to operate apparatus of the type required in connection with the electrical dehydration process. High tension electricity is not only dangerous, but, unless the conditions and mechanical arrangements are properly worked out, it is difficult to control. The average gas works operator has not had the special training that would enable him to locate and correct trouble in connection with such apparatus. For this reason, it seems to me that there is a grave question whether or not the electrical method of dehydrating tar, even if it were found to be entirely practical, would have a very wide application in the gas industry. It would probably be limited to the larger plants.

In the work which has been done in connection with the dehydration of oil, it was found that the physical conditions of the oil and entrained water had much to do with the ease with which they were separated. From my own experience and observations, I am led to believe that in order to apply this process successfully to tar, the tar would undoubtedly have to be heated and brought to a certain degree of viscosity, and these conditions maintained while the process was in operation. This necessary degree of viscosity would undoubtedly vary with different tars and with different percentages of moisture. This would, of course, mean that, in addition to the electrical apparatus, some form of heating equipment would also have to be installed.

So far as I have been able to observe the various gas plants and by-product coke plants throughout the country, the equipment for handling tar cannot be kept clean under the usual conditions of operation. It is usually the least attractive part of the plant from the standpoint of cleanness. The men who are content to stay on work connected with this part of the plant are usually lacking in imagination—to put it mildly. From a commercial standpoint, it would seem quite a problem to install and keep in operation the kind of equipment which would be necessary for the electrical separation of

the water, although, from the success with which crude oils have been dehydrated, there would seem to be little question but that tar, under the proper conditions, could be dehydrated equally well. The real questions for discussion, therefore, resolve themselves into the following:

1—How is the money to be raised for the necessary experimental work to determine whether or not the process is workable? Is this work to be under the direction of the gas associations, or is it to be undertaken by private companies, and if so, will they be required to bear the entire expense of such experimental work, or could some arrangement be made whereby these expenses could be shared by the industries who would be benefitted in case the work was successful?

2—If it were found that water could be separated from tar by this process, would it be the best means which could be discovered for the purpose?

There are many ways of accomplishing almost everything, but in most cases the best way is the simplest. It is well known that tar and water can be separated by heating the tar and causing it to ripple in thin streams over warm surfaces, the water being removed partially by evaporation and partially by mechanical agitation. The warming of the tar may be done in various ways. By some proposed schemes, the tar is brought into contact with the uncooled gases in the earlier part of the condensing process. The possibility of such mechanical schemes should be considered and contrasted with the advantages of the electrical system. There is little doubt but that a simple mechanical system would be more generally applicable than the electrical system, providing the results were at all comparable. My own experience and observations lead me to believe that the most serious obstacles in connection with an electrical dehydrating process for tar would be its initial cost and the difficulty of finding men in the gas plants who would become sufficiently interested, or have time to become sufficiently interested, in such an apparatus.

One of the most difficult things in the world is to overcome the inertia of habit and this must be to a greater or less degree done when any radical departure is made in connection with any of the processes of the established industries.

Value of the Chemist to the Gas Industry

(The Following Opinion, Read by the Chairman of the Chemical Committee, E. C. Uhlig of Brooklyn, was Submitted, Upon Request, by E. L. Hall of Portland, Oregon.)

In gas generating plants the item of superintendence naturally falls under three heads—executive, clerical and technical. In the larger plants all supervision cannot be exercised by a superintendent alone. No one questions the necessity for clerical assistance, nor for a foreman to execute plans and put work through, but all too unfortunately, the subject of technical supervision is overlooked and consequently not provided for methodically.

Technical supervision concerns: (*a*) control of routine operation and (*b*) research work.

Control of Routine Operation

Subject to local conditions and the size of the plant, a rigid system of control by means of periodical tests should be es-

tablished to insure the production of the necessary quality of gas for satisfactory service and to conform to municipal or state regulations. The most important of these tests include: (1) maintenance of the proper calorific value, (2) control of purification and (3) of general manufacturing.

(1) While it is true that appliances can be adjusted to give satisfactory service with gases, the composition and thermal value of which vary widely, yet good service demands that the established standard, whatever that may be, should be maintained with the least possible variation.

The old-time gas men were very familiar with the dissatisfaction created by poor regulation in quality and considered such a condition as tending to bring about more complaints than even the furnishing of a poorer quality uniformly.

It is quite possible to maintain, in plants having a large output and inadequate facilities, daily average departures from the calorific standard of not more than 5 B. t. u. with a maximum departure of 20 B. t. u.

The benefits to be derived from such control are very obvious to those familiar with the modern theory that good service is essential to the maintenance and development of the business. It is also true that the cost of the manufactured product may be somewhat decreased by careful supervision over the quality of gas produced, since the avoidance of extremes is conducive of less repairs, more uniform and valuable by-products, the production of less naphthalene, a reduction in plant stoppages and the avoidance of breakdowns.

Where candlepower standards prevail, the same remarks apply.

(2) Broadly speaking, purification covers the cleaning of the gas, not only chemically but physically, and nowhere is the value of the laboratory more clearly exemplified.

Control for sulphur purification is probably the most important point under this heading and embraces not only the selection of the proper raw materials for low sulphur content, but the rejection of cargoes which do not comply with the contract specifications and possibly, also, the computation of penalties imposed under such contracts. Where shipments high in sulphur cannot be refused, at least due warning can be given and the purification plant put into condition to meet the emergency.

The proper working of the purifiers can scarcely be attained without laboratory supervision to determine the proper rotation of purifiers, the renewal of oxide and the final valuation of the spent material for sale or recovering of by-products.

The cleaning of the gas physically is not so simple as might appear at first, inasmuch as the product, though seemingly free from tar and naphthalene, may, upon investigation, show appreciable quantities carried into mains, services and meters. This is particularly true of naphthalene, which, although a solid substance, is carried in the gas in the form of vapor, and, therefore, does not indicate its presence until it is actually deposited.

It is hardly necessary to draw attention to the benefits of clean gas, such as the elimination of the expensive and troublesome deposits that result in "no-gas" complaints and other interruptions in service, and materially affect the correct registration of consumers' meters. It goes without saying that no large modern plant should experience such troubles, especially from naphthalene which it is quite possible to eliminate

entirely by installing oil washers and using proper supervision. To say nothing of the loss of business due to dissatisfied customers and the loss in revenue due to meters registering incorrectly, the cost of answering the naphthalene complaints, which have reached in many companies as high as 100 per day, would alone pay handsomely for the employment of a chemist and the maintenance of a works laboratory.

(3) Not only by the analysis and selection of raw materials according to their gas-making value, but by proper supervision over the gas-making operation, it is possible for a chemist to make large savings in operation. Since this control is inherently of the nature of a daily grind and by no means intermittent or spectacular, its value is quite often overlooked and the operating results taken for granted.

Well operated plants, with the grade of fuel and with all other operating conditions remaining unaltered, will show a steady decline in the consumption of raw material from year to year without any apparent cause other than a steady and conscientious scrutiny of operating results. The technical nature of the work and the frequent tests required, absolutely necessitate the employment of a man specially trained for the position, even though the superintendent himself may be similarly trained.

Research Work

For the value of research work one has only to turn to the achievements of this country during the war period. Conservative gas managers, however, may consider their manufacturing processes so standardized as not to warrant investigations having as their object the perfecting of such processes or the substitution of better ones. No greater fallacy could exist.

Changing conditions, however, such as market prices or the exhaustion of our resources, will make it necessary to develop new methods and processes in our business. Even in existing processes the wastes are enormous. To managers who believe that they have reached the millennium, a thermal balance sheet of the plant might prove quite interesting. The value of the chemist in this connection lies in pointing out such losses, even though it be beyond his scope to suggest the remedy. Often startling improvements may be made with but slight disturbance of operating methods or the investment of little additional capital, by merely the correct application of scientific principles. In this direction, nothing is more fruitful than the analysis of stack losses, but big possibilities exist also for waste heat recovery by the control of cooling and cleaning water, especially where this is purchased from the city mains; for the complete recovery of by-products such as tar and ammonia in coal gas plants; for the maintaining of coke quality by proper attention to charges, time of duration, methods of quenching and handling; nor are the possibilities for the development of additional by-products by any means exhausted. This will be readily conceded since the war has given us the stimulus to work with hitherto neglected waste products.

Status of Chemist in Organization

I am not a believer in giving the works chemist executive authority, for the following reasons:

(1) According to the proper organization, the executive responsibility should be placed upon the foreman. Any division of such responsibility will react disastrously upon safe and efficient operation, and will create lack of harmony between the foreman and the chemist. The foreman who is charged with the

execution of the findings of the chemist has an excellent opportunity to better his technical education and his insight into the finer points of operation.

(2) Giving the chemist an executive standing and placing responsibilities on him tends to disarm his criticism of operating results and to make him biased in favor of reports that are too optimistic. On the other hand, he should be independent of the foreman and report directly to the superintendent or even the engineer of the company.

(3) The chemist with operating responsibilities finds both his time and mind engaged with other than the problems peculiarly his own. On the other hand, he should be very free to criticise the technique of operation and should be made familiar with the various operating reports as to costs, etc., in order to give him the proper outlook upon the chemical control.

The title of "Assistant Superintendent" is, therefore, misleading, and should not be conferred upon the chemist. If an assistant is necessary to the superintendent, as is sometimes the case in larger plants, such a man should not be charged with the responsibility for the laboratory work.

General

In estimating the proper value of the chemist in his own particular plant, it must not be forgotten that there are chemists and chemists, and that it is the man and not the position which demands remuneration. A chemist with a good business instinct is worth a great deal more than one with academic leanings. Such a man must not lose sight of the fact that the laboratory work is something more than a record of daily happenings. It must be a live factor in reducing the operating expenses and in improving the methods of manufacture.

An Analysis of Present Market Conditions

EDMUND S. DICKEY

BEFORE considering market conditions of to-day, it may be well to recall the very close relation between market (or merchandising) and sales conditions and to review, somewhat, merchandising problems of the past.

Three Elements Involved

Any analysis of market conditions or of resultant merchandising methods must consider primarily three elements—the producer, the selling agent and the buyer. Unless there is a well-organized, efficient production department, there can be no seller or buyer; and, unless there is a buyer or a market for the article produced, there is no necessity for the producer or the selling agent. The selling agency may appear at first glance to be almost a non-essential between the producer and the buyer, but modern business organization has so shaped itself as to make the seller a real necessity in general commercial transactions. The producer's part is to manufacture or to produce the special article or articles in his line of work. In the gas industry the producers carry the engineering and technical section of the business. These gentlemen build the works, lay the mains, put in the distribution system, manufacture the gas, reclaim the by-products and, in general, have the gas ready in the holder for delivery on the consumer's premises. The producer may construct a plant of 20,000,000 cubic feet capacity

under the most modern engineering principles, but it is still necessary for him to dispose of the gas as manufactured. In other words, he must await a buyer.

The basic principles of merchandising are well known, but the application of them varies greatly in different lines of business. In the gas industry, the finding of the buyer is in one sense a very simple matter, as all residents of any well-organized community are supposed to want, to need gas. In fact, we assume, with the well-known advertisement, that they "cry for it and are not satisfied until they get it." In part this old idea for selling gas is true; were it entirely true, there would be no need for any commercial organization for the proper distribution of the gas as manufactured.

The importance of the commercial man, or selling agent, in the gas industry has only been recognized in recent years as we have found that it is not a simple problem to induce everybody to renounce the oil lamp, or use the gas stove and other modern gas appliances. These were the comparatively small tasks of the early merchandising man, but his activities gradually increased as study and observation made it clear that not only must gas lights, stoves and water heaters be placed, but that these same appliances must be kept in use in the consumer's home. Later developments indicated that a considerable part of the commercial man's time could be used advantageously in maintenance and other service work, to benefit the customer and also to secure for the company, the benefits of satisfied consumers. Furthermore, his activities gradually broadened into an almost technical or engineering field in the application of gas for industrial purposes, starting with the hot plate in lunch rooms, the sad iron in the small tailoring establishment, the candy mixer for the confectioner, or the big kitchen range in the hotel and running through the entire line of specialized appliances for wholesale gas consumption in every possible manufacturing activity.

Three Periods Covered

In a thorough analysis of merchandising we may also classify our subject under—pre-war, war-time and post-war merchandising.

Analyses of pre-war merchandising methods have been fully discussed in papers presented to the old associations. Our remarks on producer, seller and buyer fall under this head. We might also add, that merchandising is the art of getting the other fellow to buy and that, to secure results, true salesmanship is necessary. Salesmanship at any period requires an absolutely clean platform for "Truth in Advertising" and a policy of all goods to be absolutely as represented. Salesmanship is often a question of educating the buyer to see the wisdom of or the necessity for his purchase. It also covers the question of differential in price and, granting the value of your product, the remaining problem concerns the salesman's ability to sell himself—that is, to make buyers see through glasses of the same color as his own.

In the matter of war-time merchandising, the Association is already acquainted with the patriotic efforts of the gas industry in general, but we believe that the industry as a whole is entitled also to a large share of credit for war activities undertaken by a number of appliance manufacturers whose connections with the gas industry placed them in position to serve their country through its emergency.

Merchandising under war conditions entirely reversed pre-war methods. The producer and the buyer in some instances

changed places. There are cases, under war-time merchandising, where, for example, the seller has been compelled to refuse contracts and to do other things that would have been insane under normal conditions. We believe that the experiences of the members of this Association will permit them fully to appreciate the peculiar demoralizing effect of the war period on merchandising problems.

The "Reconstruction Period"

This paper presents in reality an analysis of present market conditions. What are they? We hear the present generally referred to as "Reconstruction Period." First, it would be interesting to know just what we mean when we use the expression. What does the "Reconstruction Period" mean to this country and, in particular, to the business interests in this country? In France and in Belgium a large section of the country must be actually rebuilt. England requires very little physical reconstruction, but, with a long honor roll of losses, a large number of wounded, crippled, or semi-crippled men and a host of women war workers to demobilize, she faces a much more serious problem of reconstruction of industrial conditions than does this country. What the reconstruction of Germany or Austria may mean, it is yet too early to state but we firmly believe that in our own country, reconstruction—while largely a matter of readjusting labor—is, nevertheless, primarily a question of confidence. If we would talk less of "reconstruction" and think more in terms of confidence for a "go ahead" of business in these United States, we might secure a more concrete idea of the actual task now before the American business man.

Cost Element in Merchandising

Merchandising, under present conditions, becomes a question of costs—not the costs for a campaign, but rather the costs of material and, more particularly, the costs of labor. It may be well to recall at this point that costs on materials are primarily based on labor costs, and the first element in present market conditions is the cost of labor. Therefore, it would be well to consider carefully the bearing of labor interests on a renewal of industrial activity in this country.

Labor now demands higher wages than at any time in our history, with a consequent higher price on materials. We believe that these higher labor costs are to a greater or less degree (probably greater), here to stay, for labor is organized to hold its own and, in plain language, it demands money to spend. It has become educated to the habit of spending—not merely for the necessities of life at the old cost, but for those necessities on a higher cost plane, and for former luxuries which are now considered necessities.

We are discussing present market conditions and it is not our desire to broaden this paper into a discussion of general economic principles, but the two subjects are closely related. For instance, final conclusions on wage schedules or labor costs cannot be reached without giving consideration to the cost of living and other similar economic problems. We would only call attention to previous experiences here and in the world at large as to costs of labor and living. A review shows that these two items usually run true to form and immediately preceding any great war, there will be a period of depression with low costs of living and low prices on labor;—these low prices have been extended into the early days of war. The actual war-time destruction, both physical and economic (the

direct outcome of warfare on a large scale) has, however, always produced high living costs and consequently a high labor or wage scale.

Furthermore, previous national or international war conditions show that whereas the period of low prices represents a comparatively limited number of years prior to or at the actual beginning of hostilities, the scale of high costs brought about by actual warfare, drops very slowly. This is particularly illustrated during the period following the Napoleonic, the Austro-Prussian or Franco-Prussian and our own Civil War.

In our judgment, while labor prices, especially for so-called common or unskilled labor, will undoubtedly drop, the cost for skilled labor, if it does recede, will do so slowly, against strong opposition, and we certainly cannot look for a return to the pre-war scale. It therefore follows, if labor demands higher wages, that we may expect costs on materials to remain relatively high.

It may be suggested that while manufactured materials may retain higher market value, raw materials will recede in price. Just what is meant by "raw materials"? Raw materials in one man's business are manufactured, or produced, materials in another's. We are accustomed to classifying such substances as copper and iron under this head, but true raw material, even in these products, would be the ore unmined. The minute we approach it for mining, the labor element enters. Labor is required to mine the ore, to bring it out of the mine, to treat it at stamping mill or smelter, to re-handle, assort or re-assort it and, again, labor is an element in transportation all along the road. Similarly, the cattle on the hoof represent raw material or the wool on the sheep's back, but labor is involved in bringing these even to their first market. In fact, we might almost say that there is no such thing as a true "raw material" free from all labor costs.

Supply and Demand

In any discussion of present market conditions you will always hear statements regarding the law of supply and demand. It is usually found that when any material is scarce, the price goes up. Under the law of supply and demand, as this same material accumulates in surplus stock, the price gradually recedes. A similar law operates in the labor market—surplus labor means a reduction of wages. However, a partial suspension of this law as to material and labor may be temporarily brought about by its operation in connection with the actual money in circulation.

Under our present system of banking, money—or the equivalent circulation medium—is readily available and, in one sense, it may be stated that we have a surplus supply of money at hand for legitimate business. From this viewpoint, the surplus money is cheaper and therefore represents less buying power than at previous times. Again, it is quite possible that the organization of labor may in some degree affect the action of the law of supply and demand in that field. On the other hand, a surplus supply of products tends to reduce selling prices even while it occasions a slowing up of production and, therefore, an increase on overhead charges as applied to manufacturing costs on the finished article

The situation as to manufacturing costs brings us directly to the position of the producers or manufacturers throughout the country at large and the question of their attitude under present market conditions. It may be of interest to state that the manufacturers' representatives very rarely find any considerable effort on the part of gas companies

to secure cut prices on appliances offered and we believe this is primarily because the gas companies have gradually come to recognize the standard quality of practically every well-known line in their field and the fact that manufacturers of these appliances are in business, not for a year or two, but for an indefinite period. The producer who hopes to retain the business of the comparatively limited number of buyers in the gas field has always known that he cannot charge exorbitant prices in a competitive and limited market. This buyer has gradually realized that his gas appliances are coming to him at a fair price for a well-designed and well-made standard article.

Beyond the gas industry, general manufacturers and jobbers have noticed during recent months a tendency among buyers to ask or expect cut prices. We are interested in the situation only insofar as it relates directly to present market conditions and, particularly, to merchandising during the so-called "Reconstruction Period." Buyers must remember that products cost the manufacturers higher prices for materials, labor and overhead. In numerous cases certain materials have been unobtainable under war priorities, except at very high costs, or normal supplies have been shut off entirely. Manufacturers have been compelled in some cases to spend heavy sums in the experimental development of substitutes.

The question of quantity production is another element in higher prices. Not all manufacturers have participated in the large production on war work and some plants now turned back to peace time operations find considerable decrease of activity in their regular lines. This means lessened output with, invariably, a direct increase of overhead to be figured in cost of production.

On the general question of cut prices, we merely maintain the general principle that cut prices are destructive to the integrity and permanency of any business. A man will not have continued faith in a cut price salesman or manufacturing concern. The manufacturing concern that cuts prices will sooner or later cut quality to make costs conform to the lower prices offered and, in the end, the buyer who receives inferior goods suffers as greatly as the manufacturer, who loses in reputation and eventually in business.

Another thought to be presented from the manufacturing view-point concerns the working force which each manufacturer must maintain. If he discharges any great number of his skilled men it is comparable to the gas company that decimates its technical or commercial department. The manufacturer must maintain his skilled working force, just as both the manufacturer and the gas company must hold their equally skilled technical or commercial men if the organization is to be held intact and in readiness for future production or selling.

To a certain extent it may be true that gas sales often follow appliance sales and the amount of gas consumed is to a greater or less extent dependent upon the number of appliances installed. Here the manufacturer of gas appliances stands in very close relation to the sales department of the gas company, but even under these conditions, it must be recognized that appliances require service. The commercial and service organizations in any gas company should be the last to be disrupted if the real end of our public service is to be maintained at its proper standard. Gas managers will do well to recognize that service, in the final analysis, is what sells gas and, even more important, it is service that guarantees good will in the relations between the public and the public utility.

Active Service and Public Relations

If our expectations for continued high costs on labor and materials are at all justified, it would appear that American business and industry had better recognize the situation rather than take losses while waiting for price reductions which may not come as quickly nor be as great as expected. Again, if prices are not to recede materially, then it becomes wise to recognize the new value of the dollar in both labor and materials. Then the main problem is largely one of figuring your selling price on present production costs, and of selling your share of merchandise against the buying power and desire to spend of the high-priced labor that brings its low value dollar into your market.

The adjustment of selling prices in keeping with low dollar value is recognized as presenting special difficulties to the managers and the executives of public utility corporations. Here, rate adjustment is the primary factor and this depends largely upon the relations between utilities and public. We could hardly be expected, in a paper of this nature, to offer a tangible solution of this problem, but we would like to present one aspect of relations between the gas company and the general public. A representative of a large operating company established in a number of towns declared that in a town where its service was poor, a complaint answered in twenty-four to forty-eight hours was apparently accepted as satisfactory service. In an entirely different city, where its service was good, if a complaint was answered in three hours the chances were that the company heard a grumble because the complaint was not answered within the hour. On question, however, the gas man admitted that he was speaking from his twenty-odd years of experience rather than of present conditions. The reply was that the public service corporation is to-day facing entirely new conditions in its relations to the public and it is quite possible the near future may reverse the heretofore almost universal tendency of public opinion to condemn any and all types of public service corporations.

A ray of light affecting the relations between the public service corporations and the public in general has come to us through Government control of railroads. It may be interesting to refer to a long article in *The Commercial and Financial Chronicle* of February 8, 1919—"The Gravity of the Railroad Situation." This gives statistics showing earnings, both gross and net, on practically all of the roads of the country, with comparisons between 1918 and 1917. We wish to quote one section of the article, which reads as follows:

> "The exhibit ought to arouse the attention of the whole public. It is startling in the results it discloses. Out of 185 railroads reporting to the Interstate Commerce Commission for December, 1918, it will be seen that no less than 72 roads failed to meet ordinary running expenses and 10 more failed to earn running expenses plus taxes, making altogether 82 roads (out of 185). The list contains nearly all of the most prominent railroad companies of the country. It will be obvious that such a situation, if not soon corrected, must spell disaster not alone for the railroads but for the country as well."

Again, an editorial in the New York *Evening Sun* of January 28, 1919—"Mr. Hines' Little Bills"—discusses the present financial situation which the Government faces in its control of the railroads.

> "Over and above the dividend and interest guaranteed by the rentals, the railroads have already, during 1918, cost the Government such a sum as would have paid in the year 1913 all the roads' interest payments, all their dividend payments, all their betterment charges and all their deficits."

Another news editorial entitled "With-

out Redress" shows clearly that under Government control the railroad service to shippers and the general public has been most unsatisfactory. One very significant paragraph says:

"If the members of Mr. McAdoo's staff had deliberately planned to make Government operation so unpopular that it would tend to kill any possible movement toward Government ownership, they could not have adopted more effective methods."

The gas industry is, of course, largely affected by the general conditions of business throughout the country, but it is not our purpose to include dry goods, food supplies, etc., in our discussion. Our attempt is to analyze conditions directly related to the situation facing the utilities and, in particular, the gas industry at this time. The following incident which occurred within sixty days is apropos.

Policies of Gas Companies

A manufacturer's representative found on a visit, which fell on a Monday, that the gas company had run a page in the morning paper, advertising a special lot of 171 odd sizes of gas ranges, left over after inventory, it was stated. We do not vouch for all the statements in this advertisement, but we do know that by 10 o'clock on the same Monday morning, more than 100 of the stoves had been sold; by 12 o'clock noon, more than 140 had been sold and at closing time, 5 o'clock, the entire 171 stoves, with but two or three exceptions, were gone. Bear in mind, this was not a sale of smaller stoves, but of ranges varying from the medium styles to the very largest and best types used in private homes. The incident is related to show the buying power of the masses—if they are securing high wages it is possible to sell them high priced goods. The buying power which is present will operate if the appeal is properly placed before the public

At the time of writing this paper, in early February, we find the same company offering in a Sunday display advertisement, 365 stoves at presumably special prices—the selling to begin the next day and to be limited in time. And the chances, basing our opinion upon the former experience, are all for the complete success of the sale.

The manager of the property in another city fairly took this manufacturer's representative off his feet by announcing that he might wish to purchase so many thousands of certain appliances. The quantities mentioned would constitute, even in normal times, a good sized order, but the salesman camouflaged his surprise and promised to produce the appliances if given time and sufficient advance notice. The manager then said:

"I am asking my Board of Directors to give me permission to run a high pressure line so many miles from the city." (The mileage, by the way, was not measured in units, but in several multiples of ten.) "It is true that the cost of pipe, materials and labor is high, but is it going to be any lower this year or next year? Personally I do not expect a decrease within two years from now. I can show my Board a gain of 35,000 consumers on this line. Aside from interest on additional investment, I shall have no increase in overhead and I already have the surplus gas. I calculate that the profit on gas sales from the moment the line is put into operation will at least offset any decrease in the cost of installation that can be reasonably expected. With my own view of the labor situation, I believe I can make money on the risk even on a one-year proposition and, in any event, if I break even, I at least have the gas line in and one or two years of doing business in that territory to its credit."

Building Activities Reviving

In another city, the general manager of the gas company admitted that his requisition for certain appliances was smaller than usual since he did not look for any large business this year. Of course, he might be forced to make ex-

(*Continued on page 209*)

National Gas Range Week

MAY 12-17, 1919

¶ Another Campaign for Saving.

¶ A week of revivification.

¶ A good reason for starting "Go Ahead" plans.

¶ An Institution now six years old, with nothing but successes to its credit.

¶ In 1916, reports from 18 companies showed the sale of 10,103 gas ranges with one water heater to every 10 ranges as a side issue.

¶ In 1917, 4,139 ranges were sold by ten companies.

¶ In every report, enthusiastic comment on increased sales of water heaters, gas irons and other auxiliary gas appliances during Gas Range Week.

¶ The date---May 12-17---for using high power that will be felt all summer.

¶ A week dedicated to thrifty housewives and progressive gas men.

MAY 12-13-14-15-16-17, 1919

National Gas Range W

The Sales Event of the Year

THE practice of setting aside one week of the year, known as National Gas Range Week, for a concerted drive on the sale of gas ranges, has been observed by the gas industry for the past few years. These activities have proved their worth in stimulating the sale of gas ranges. If there was ever need for stimulation in this branch of the industry, it is at this time for, because of the trying conditions under which they have been operating, a large number of gas companies have greatly depleted their selling forces and have sadly neglected the sale of gas appliances. Every encouragement is needed to renew interest on the part of the gas companies as well as on the part of the public. The National Gas Range Week movement, therefore, is opportune and should form a nucleus for continued activities.

National Gas Range Week has been set one week later this year than during other years, in order to avoid interference with the Victory Liberty Loan campaign. Our customers will be asked to subscribe to this Victory Loan and, in view of such obligations, we believe that more attractive terms than have been offered heretofore for the sale of gas ranges will greatly aid the success of National Gas Range Week.

Appliance manufacturers and gas companies should conduct a strong publicity campaign which should be supported by the sales and other departments of gas companies, so that the demand for appliances will be recreated. We have all been taught wonderful lessons by the successful work of the publicity committees of the Liberty Loan drives. The best talent in the country was called upon to arouse interest in the loans. Excellent suggestions can be had from the plans used by the committees that can be made applicable to the drive for the sale of gas ranges.

During other National Gas Range Week campaigns, many good ideas were suggested and plans adopted which, if used with real punch, can be made to serve well at this time. The following references give the items in this connection that appeared in the *Monthly Bulletin* of the National Commercial Gas Association:

1915 Volume—March, 162-163; April, 210-211; June, 328-339.

1916 Volume—February, 50-51; March, 100-101; April, 149-154; May, 199-201; July, 337-348.

NATIONAL GA RA

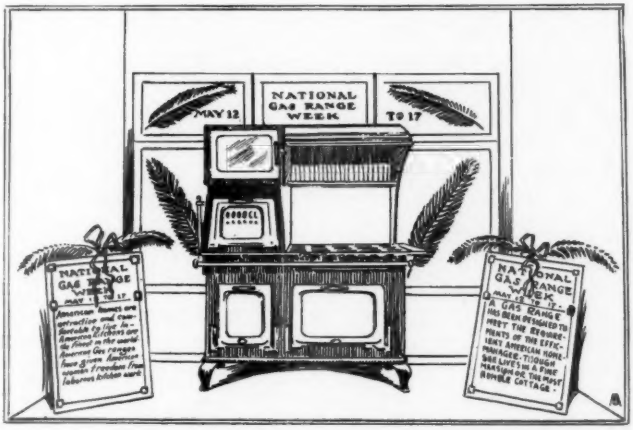
MAY 12 7, 19

Week, May 12-17, 1919

More Important Than Ever

1917 Volume—April, 178-189; May, 245-248; July, 396, 403-421; August, 466.

1918 Volume—April 138-143; May, 182-184.



Of course, it is understood and realized that appliance manufacturers shape their advertising and publicity to meet conditions in general throughout the country. The representatives of gas companies should make a special study of the advertisements, window displays and other attractions offered by the manufacturers, as well as those described in the above references. Only such plans should be adopted as will best appeal to the people of the community served; but no plan, however well developed, will meet with success, unless every detail is seriously considered and carefully executed.

National Gas Range Week should receive the hearty co-operation of every member of the American Gas Association.

H. K. Dodson, *Chairman,*
Sales Campaigns.

GAS RANGE WEEK
MAY 12-17, 1919

Closing Remarks

ON THE

Victory Liberty Loan

"WE are asked to pay for things that were never used; we are asked to pay for shells that never were fired; for cannon that never reached the battlefront, but we are asked to pay for those things that helped in a major way to bring this war to an end in 1918 instead of 1919. And the bringing of this war to an end twelve months before we could logically look for it means that we are asked to pay for saving the lives of 100,000 or 200,000 American boys who would have died on foreign soil had the war continued another year."

—Extract from a speech by Hon. Lewis B. Franklin Director War Loan Organization, U. S. Treasury Dept.

Victory Liberty Loan

Prepared by American Association of Advertising Agencies co-operating with United States Treasury Department.

(*Concluded from page 204*)

tensions and thus require additional appliances, but his tone implied that he wished to make no extensions and would certainly evade the issue, if possible. In that very town, the afternoon paper quoted a meeting of the local Buildings' Trade as authority for the statement that at least 20,000 new homes must be erected in the town with the least possible delay.

An article in the New York *Evening Sun* of January 28, 1919, says in part:

"The Department of Labor is seeking to bring about a revival of building operations to absorb some of the men coming out of the army, but difficulty is being encountered because of the high price of labor and material. Representatives of building and loan associations estimate that in ordinary times it required the building of about 600,000 homes per year to meet the normal growth of the country and replace the losses occasioned by fire and other destructive agents. In the past two years this construction of homes has been virtually suspended. At this time there is a shortage of almost a million homes in America and to this must be added the normal requirements of the year just opening—a figure approximating 1,600,000 homes to be constructed during the current year."

The possibility of a revival of construction activity may be gathered from a recent article in one of our large daily papers, under the head-line "Builders Answer Call."

"The United States is rapidly getting back to normal conditions in the matter of construction. The Government is urging that builders do not delay their enterprises because of high costs of material and labor, for it believes that prices will adjust themselves as construction progresses. Many exceptional building projects are now being started and this city is promptly falling into line with other leading cities of the country."

There is further reference to a statement from the United States Department of Labor, listing numerous important business projects coming to the Department's attention within the week preceding the writing of the article. The following excerpts illustrate our point: New York City to have new $1,750,000 apartment, Fifth Ave. and 72nd St. Another building to cost from $2,500,000 to $3,000,000 is planned for Seventh Ave. and 39th St. Work is already ordered begun on the Masonic Temple, estimated cost $750,000, at 23rd St. and the Parkway. Baltimore is to have a new apartment to cost $1,000,000. Meridian, Miss., will build a $100,000 Y. M. C. A. building. Los Angeles, Cal., is to have a 1,000-room hotel and apartment building to cost $1,000,000. Building permits were issued in Long Beach, Cal., in January amounting to $250,000. Chicago is to have a $1,500,000 hotel, also a $300,000 apartment. Louisville is to have an office building to cost $600,000. This same article names a certain city of the Middle West with a population of approximately 170,000; the number of people in the whole district supplied with gas approximates 240,000. The article lists for this city, public works of an exceptional nature, including $3,200,000 for improvements and extensions to the Railways & Light Company—not municipally owned.

A gentleman representing financial control in the gas company of a southern city of approximately 60,000 inhabitants, where there are 50,000, both white and colored, in the district supplied with gas, recently informed a commercial representative that $100,000 had been set aside to carry on a normal program of construction and extensions, for 1919; $100,000 for new extension work, improvements and betterments in a city of 50,000 to 60,000 population represents a fair average expenditure under normal conditions.

In another case the manager of one of our larger syndicates declared that his company would not attempt a great amount of extension, but, nevertheless,

would carry on an active campaign to fill all existing lines to the saturation point. This manager felt he would thus insure himself a profit through quantity sales if the future showed a reduction on coal and other items which might bring about reduction in rates. He wished to secure the old equalizer of quantity production against possible lower prices.

The above illustrations are actual incidents quoted as closely as possible from interviews with different gas managers; they show a decided variation of thought as to policies or methods to be adopted under present conditions.

The natural question comes—"Who is right?" Secretary Daniels, in recent public statements, says wages will not come down. Railroad men and the unions generally make the same emphatic statement. As a matter of fact certain wage agreements entered into since the armistice and made in some cases to cover 1919 show further wage increases. We have recently witnessed the possibility of serious conditions as evidenced in New York dock strikes, the textile strikes, the Seattle strike and other disturbances.

It might be interesting here to consider the recent newspaper reports setting forth the demands of the French National Federation of Workers. It appears that French laborers are asking for a Labor League of Nations. We wish to emphasize only the following items: Demand for eight-hour day. (Before the war the working day in France was ten hours.) Demand for continuance of war-time wage scale. (The average increase during the war in France, including bonuses, was 50 per cent.) Demand for the incorporation of all war-time bonuses in regular peace-time wage. French labor is apparently in full accord with American labor in the effort to sustain wage schedules with a resultant continuance of present labor costs.

Conclusions

We repeat the inquiry—"Who is right?" Will the cost of labor and materials or, in other words, will present market values remain at anything like the present high standard? If not, when will they be reduced and, if reduced, how much? Is it a good policy to wait for this possible reduction?

In answering these questions, two view-points must be taken. First, is it a good policy, merely from our own individual view-point, to wait for reduction? Second, speaking nationally, is it a good policy for this country as a whole to adopt a retarding policy of waiting for possible reductions with a consequent slowing up of general business and industrial conditions? This question really strikes at a fundamental point, in the problem of market conditions during the so-called "Reconstruction Period." How long can we wait for possible reductions? How much can we slow up business without greatly disturbing the prime element of the "Reconstruction Period;" namely, business confidence throughout the country?

Will more money be saved by waiting or earned by accepting present conditions and proceeding with development on a normal or semi-normal program? In the attempt to answer this question in the gas industry it is necessary to go back of the commercial or engineering departments—to headquarters; that is, to the management of the company. The question should be squarely up to the executive. From the progressive view-point he may argue to spend the money necessary for betterments and extensions, have these charged to capital and, if new capital is required, issue new securities on

an approximate basis of 80 per cent. of the cost of betterments. The reverse of this problem also immediately occurs to him—We are adding to our capital and will this be justified in view of possible later rate valuation?

During the period of the war, with the excessive demand for gas, a great number of customers could not be supplied. These people are now clamoring for gas. If their demand is not met, will not the company be subjected to severe criticism? In other words, if we do not go ahead, the public will call us dead. On the other hand, if we must go ahead, and if we must spend money to go ahead, we at least become a live, progressive organization in our community and we are accepted by it as such and more friendly relations between the corporation and the public will most certainly follow.

We might further consider this question from the view-point presented by Mr. P. F. Royce as he assumed charge as general manager of the Brooklyn Rapid Transit System (New York *Times*, Jan. 31, 1919):

"So much, however, I can say. I have been identified with the management of public utilities, including traction companies, for many years and I have always found that the companies which served their patrons best, paid their stockholders most and so I have always insisted that properties with whose management I had to do should give the best service possible."

The matter of capital expenditure is largely up to the executive, who has the pro and con to consider on the points brought forward above and who must, in addition, consider himself as in a dual position. Even under present market conditions in the utility business, he has first to consider his duty to his customers, since he operates a public service corporation, and then, his duty to his stockholders and if he can combine these duties under one policy, even with an increase in capital, he is covering his situation in the most complete manner possible.

In conclusion we assume a reasonable acceptance of our statement that reconstruction in this country is largely a matter of confidence. If this is true, we must work to secure a renewal of confidence in business in order that it may proceed at once along general and normal channels. In the gas industry, our work of reconstruction must not only consider a return of confidence in general, but also the broadest possible efforts for progress in our own particular field. We must not invite disaster at this time by standing on a program entirely lacking in progressiveness; we must not fail in our duty to the public and to our stockholders. We must "carry on" and to do so will mean that we must inaugurate a campaign in our own business for a renewal of every possible gas activity and, at the same time, we must put our shoulder to the wheel in the national effort to "Go Ahead."

NATIONAL GAS RANGE WEEK

MAY 12-17, 1919

FOR BETTER BUSINESS NOW

Industrial Fuel Outlook

WILLIAM A. EHLERS

NO questions can be more pertinent to the gas industry to-day than those that affect the increasing of returns on capital invested and the profitable future expansion of gas interests. With over 1,000 companies in the United States manufacturing and supplying artificial gas to approximately 8,159,000 consumers, and a total annual sales amounting to over 259,000,000,000 cubic feet of gas, we have conclusive evidence of the very important position which the gas industry holds in the economic development of our nation to-day. Are we, however, using the resources at our command for the proper development of the gas business in keeping with the progress made by other industries? This is a question of the greatest importance to gas men to-day.

A well-known scientific man, writing recently in one of the gas journals, says:

"In these days of evolution and revolution, is it not proper that we scan the situation critically as to future developments, that we indulge ourselves in speculating upon possibilities which are now latent or undreamed of—that we take stock, if you please, of what we have been doing and of what we might do if we knew how?"

By-Product Recovery

The fundamentals of the gas industry are so related to the natural resources of our country that the industry's adequate development requires a proper appreciation of these resources, which should, therefore, be matters of first consideration.

Authentic figures on the annual production of coal in the United States indicate that 33⅓ per cent. is used for industrial heating and power operations, not including transportation systems. Only about 1 per cent. of the total annual production of coal is used for strictly gas-making purposes. In handling this 1 per cent., little consideration has been given to the *complete* recovery of by-products, although many plants effect a partial recovery of ammonia and tar, and a few produce gas-house coke for domestic and industrial uses. Plants operated with complete by-product recovery are rare.

It is needless to enumerate the materials which can be obtained by the destructive distillation of coal in by-product ovens, for these are very generally known to gas engineers. Coke for metallurgical uses and gas for domestic lighting and cooking have, in the past, been considered the essential products of distillation and this condition has brought about a distinct division in the application of the process, a division which we would do well to eliminate as far as possible

Several important factors have contributed largely to retarding the development of by-product coking in the United States in the past. There has not been a sufficient demand for the by-products (coke, ammonium sulphate, benzol and tar) because of the inadequate development of the coal-tar industry, and there has been apparently, a great lack of appreciation for the opportunity offered by the manufacturing industries to gaseous fuel.

The exigencies of the world war showed conclusively how inadequately prepared our country was, and the Allied Nations too, to meet the urgent

needs for coal by-products. The United States was even less well equipped than England. The gas companies' difficulties, however, have been so largely occasioned by economic conditions, and by the character of public regulation, that they are not entirely responsible for their apparent delinquency.

Meeting Entire Fuel Demand

The average plant manufacturing gas, as it exists to-day, meets only a small part of the fuel needs of the community which it serves, but it does represent an established activity which can be converted into an organization capable of supplying all the fuel, either gaseous or solid, which the community may consume.

The by-product coke plant, as commonly thought of, is not well suited to produce the kind of coke which can easily be disposed of for general purposes. Moreover, the size of units necessary for even the smallest plants makes them impracticable for the city of average size. However, it is possible to substitute for the by-product coke plant, a by-product system of coal distillation which will produce an excellent grade of coke for domestic and other uses, ammonia for fertilizer, benzol for motor fuel and munitions, tar for waterproofing, road dressing, etc., and gas in abundance for industrial use.

Domestic vs. Industrial Load

Since the time of Peale, representing over one hundred years of activity, and until very recently, the gas industry has been content to supply gas for lighting and domestic uses only. This meant a high peak extending over a short period; consequently the domestic and lighting load represents a very undesirable load factor.

Many situations can be cited where the possibilities for gas in two or three manufacturing plants would equal the entire daily send-out of gas for domestic uses. It seems only rational that the management of every gas undertaking should survey its territory for the purpose of determining the domestic and industrial fuel requirements as to both coke and gas and on this basis, plan for increased facilities for the production of *fuel* to meet the needs. Then, in place of a small plant producing and distributing chiefly, gas for domestic uses, there may be substituted a centralized fuel agency for the purchase and distillation of raw coal and for the distribution of all the resulting by-products. Such a plant would produce sufficient coke for domestic purposes, to replace coal, and give an abundant supply of gas for manufacturing purposes to meet exacting requirements where coke and oil are now being used. In other words, in place of a plant whose chief interest lies in the manufacture of gas, we would have a plant whose interest is the marketing of all the products of coal distillation.

You say this is visionary. Yes, if you mean that it looks toward a condition not yet existing, but did you ever know of a commodity being successfully marketed before facilities for producing that commodity were established? There are many instances in our industry where local gas plants are working very close to their maximum capacity, with large opportunities around them for further industrial gas sales which they cannot take on. But, before they will enlarge their facilities they apparently want an iron-clad contract with prospective customers guaranteeing to them a definite increase in business. Such contracts—outside of wartimes—cannot be had, although the market, in many cases, already exists. It's up to the gas company to see the "vision," and then deter-

mine how to offer the output of the enlarged gas plant at an attractive and profitable figure.

Industrial Fuel Possibilities

The future for industrial gas fuel is definitely tied up with the complete utilization of all the value contained in coal. This cannot be denied. That there is a popularity and demand for gaseous fuel is proved by the varied industrial uses of natural gas where the supply is plentiful and the price, as a factor in the cost per unit of output, can compete with that of other fuels. This shows conclusively that the gas companies take no chance in placing gas fuel at the disposal of manufacturers, provided only their price is fair and consistent with a reasonable return on the capital they have invested.

In fact, the field for industrial gas fuel is limited only by the industrial demand for fuel of any kind. Its ultimate use will be to displace these other fuels such as coal, coke, oil, etc. But to accomplish this, serious consideration must be given to acquiring and marketing the other products of coal distillation. Industrial gas fuel must be placed on the market at an attractive price, and with it a service which will command the interest and confidence of men of industry. They will welcome our product if the price—when all factors are taken into consideration—is such as to make it more desirable to use our product than to use the solid or liquid fuels. The first essential, therefore, is to break down any prejudice now held by industrial consumers of fuel against the idea of using gas, and establish a service which will win the entire confidence of the manufacturer.

While we have made considerable progress in promoting the use of gas fuel in the industries, we have barely scratched the surface of our opportunities. There are large centers of industry where the use of manufactured gas is as yet almost entirely unknown. Localities where forging, heat treatment of metals, brass melting, galvanizing and core drying are done on a large scale, still use crude fuels, although these industries offer exceedingly large possibilities for our product.

Selling Rate of Gas

The unprecedented high market values of commodities necessary in gas manufacture have, undoubtedly, placed a heavy burden on gas undertakings, and the petitions for higher rates from public regulatory bodies have been numerous. It must be remembered, however, that there has been, until very recently, a corresponding increase to the consumer in the cost of other fuels. Therefore, it would seem that the ultimate results are affected but very little; that is, the problem of competition on a price basis has not been complicated by these increases. The sale of industrial gas can be governed by the same market conditions that regulate the prices of other fuels, and a reduction can be made when the cost of labor and materials justifies.

The rate at which gas must be sold is not the determining factor in increasing industrial fuel sales; there are other conditions to be considered; nor is it my prerogative to outline a schedule which will specifically apply to every situation. It is encouraging, however, to see that a few companies have given careful thought and consideration to rates for industrial gas, although the majority of them adhere to the old "straight line," "step" and "block" rate methods. None of these methods of themselves seem to meet adequately the expectations of the manufacture or to give a fair return on gas operations.

If we are to take our proper place in the manufacturing industries, we must sell our product on the basis of a *fixed charge* for established service and readiness-to-serve, plus a *low* rate-charge for all gas supplied. The manager of an industry usually thinks in terms of fixed charges and running expenses in connection with production costs, and he is always more receptive to arguments in favor of gas when the cost of gas service is approached from that angle. Moreover, with such a rate schedule, the gas company is more easily able to offset the cost of privately operated gas plants, and, furthermore, it gives a more intelligent and comprehensive idea of the real relation of gas production costs to the load factor.

The Appliance in Gas Service

We are coming more and more to realize that the usefulness and consequently the demand for gas fuel depends upon the proper type of appliance selected for the particular purpose. Industrial fuel salesmen often make a very serious mistake in being over anxious to close a sale for the credit of the sale alone and not for the ultimate results to be obtained. Such a practice is generally followed by serious consequences, for one unsatisfactory installation can kill a dozen possibilities. Instances have come to the writer's attention where sales have been closed for a price rather than for economy of operation and higher efficiency. The folly of this attitude can be illustrated by an instance coming under the writer's observation recently. A large manufacturer became interested in replacing a privately owned producer plant, with gas from the local company for brazing brass tubing. The operation required approximately 2,000 cubic feet of gas per hour. One or more propositions might have been offered where the total cost of the installation would probably not have exceeded $350 to $400. But with the existing factor of unskilled labor and the desirability of having positive control over the air-gas mixture, a single valve air-gas pre-mixing system was offered, costing approximately $3,500. There was no difficulty in convincing the works' manager that the advantages to be obtained by the higher priced equipment easily offset the higher cost and the deal was closed on this basis.

The appliance plays a very important part in our success or failure in industrial applications. Consider it as a means of demonstrating the usefulness of gas, and we should be most careful in our selection of proper appliances for the various industrial operations. Low rates for gas will accomplish very little if appliances are inefficient and improperly selected and installed.

Our Field in Brass Melting

It has been pointed out earlier in this paper that brass melting offers an attractive field for gas utilization, but here let me remind you that rapid progress is being made in the electric industry to secure this business. Not every type of electric brass furnace meets every melting condition in the brass industry, nor does it have all the advantages theoretically possible in an electric furnace. Hence various furnaces have been put out to meet various conditions.

Records have been secured from actual operating rests on twelve on thirteen different types of electric furnaces for brass melting. These have been installed in such plants as the Bridgeport Brass Works, Hayes Manufacturing Co., Lumen Bearing Co., Baltimore Copper Smelting and Rolling Co., National Cash Register Co., Crane Co., Chicago Bearing Metals Co., Scovill Manufacturing Co., Bristol Brass Co., and others.

It is reported that a comparison on a ten-hour schedule, between electric furnaces and coke fired crucible furnaces indicates that the cost per ton of charge for electric power with interest and depreciation, electrodes, linings and heating ladles, is about one-half of the cost of the single item of crucibles for coke fires at their present cost and crucible life. These results, however, are based on the rocking type of electric furnace.

In discussing the subject of brass melting with many experienced operators, there seems to be a well-founded prejudice against the rocking type displacing the old crucible type of furnace. As far as results, up to the present time, seem to indicate, the application of gas to brass melting in the rocking type of furnace has not been a success where yellow brass is to be melted. If, however, objections to the rocking furnace are well-founded and insurmountable, we should give our best efforts and skill to the development of a high efficiency, gas-fired crucible particularly for the melting of yellow brass. Also, we should determine by practical tests, limits of metal composition for "red brass" for the melting of which direct-fired gas furnaces may be utilized.

This suggests a central development laboratory whose function it would be to take up matters of this nature and to determine, beyond all doubt, the very best we might hope to attain in this as well as in other fields of gas utilization.

In order to secure our share of central station heating, we must be responsible for the proper development of the most efficient devices for the utilization of gas. One illustration from brass melting will be sufficient to demonstrate this fact. It is easily determined that to melt 100 pounds of brass requires approximately 26,000 heat units. Results so far obtained indicate that we cannot do much better than 400 cubic feet of 600 B. t. u. gas per 100 pounds of metal—a thermal efficiency of 10.8 per cent. In other words, for every 400 cubic feet of gas burned, we utilize only about 43 cubic feet and 357 cubic feet are lost. With such results facing us, it does not seem that we have reached the ultimate point of high efficiency in this particular operation. It presents a problem for our central laboratory.

Industrial Fuel Committees Recommendations

The Industrial Fuel Committee of the American Gas Association has laid out a very constructive program for this year, and it is hoped that their recommendations will be given most serious consideration by the leading men of the gas industry. One of the most important points in the committee's recommendations concerns the necessity of performance standards.

Unfortunately for the industry, appliance manufacturers in general have looked with disfavor upon both of these subjects. The electric industry, however, has long realized the need for standard specifications in the manufacture of apparatus, and has found them a help, apparently, rather than a hinderance to the proper development of the industry. No logical or well substantiated argument has yet been advanced by opponents of this activity. Certainly there can be no serious practical difficulties encountered in building gas appliances to meet an established standard as to the character and proportion of the insulator, fire resistance linings, ventilation, air and gas connections, etc. It cannot be argued that such standards would take away individuality in the design of equipment, which is, of course, the prerogative of each manufacturer.

Furthermore, your committee feels that we are not reaching the men of

various industries who are most vitally interested in fuel applications. Therefore, it voices as the purpose of the industrial activities of the Association, a plan to prepare interesting and instructive articles for the trade journals, and to publish periodically a suitable pamphlet relating specifically to the use of gas in a particular trade or industry. This publication will be available to gas companies for distribution among the manufacturers and industrial plants engaged in the particular line of work treated of, and it should offer an economical, as well as a very direct means of presenting industrial fuel facts to prospective customers.

We believe too in the expediency of placing the industrial fuel service of the Association at the disposal of manufacturers. Several requests for such service have come to Association Headquarters, and we believe this to be indicative of the fact that manufacturers are looking upon gas fuel with more optimism than in the past. We should, therefore, encourage and cultivate this feeling by either giving or selling such "consultation service" where it may be desired. This policy would not only help the gas industry as a whole, but would probably establish a closer relation between the manufacturer and the local gas company.

The Immediate Past and Future

After the Armistice was signed, there was a moment of uncertainty in business seldom, if ever, paralleled in the world's history. Under wartime conditions, a great demand existed in certain localities for gas fuel to meet the need of exacting specifications and rapid production. As the result of a questionnaire sent out to all gas company members of this Association about a month ago, seventeen companies reported that they had sold gas in large quantities for purely war emergency work. The amount of gas sales reported for such emergency work ranged from 1,000,000 for the lowest to 393,000,000 cubic feet per year for the highest consumption—the average being in the neighborhood of 25,000,000 cubic feet. It is of interest to note further that the majority of the companies reporting, expect to retain only about 10 per cent. of this business.

Now, since the war is over, many lines of industry will necessarily be discontinued, but others must and will spring up to take their places. We also must be alert to the situation and find new fields for the use of gas and other coal distillation products.

A disposition to retract has been noted on the part of some gas companies during the period of high prices and among them very little effort has been made to increase the output by industrial gas sales. That this policy has not been universal, however, witness one of the larger companies which has continued to push its commercial activities in the face of the trying and serious business conditions confronting public utility companies during this period.

Again, it is interesting to note the results obtained in gas sales by a comparatively small company in New York State during the same period. The total yearly output of gas from 1915 until 1919 shows a consistent increase of each year over the previous one, of from 10 to 23¼ per cent. This increase has been almost, if not entirely, due to the increased sale of gas for industrial uses.

The true situation facing our industry is well suggested by an editorial which was published recently in a Washington paper:

> "All that Americans need to do now, if they wish prosperity, is to cut out foreign notions of government, throw away their worries over the Peace Conference and the settlement of foreign questions, roll up their sleeves and get busy."

The Case for an Advertising Section

MILT SAUL

THE advocates of an Advertising and Publicity Section in the American Gas Association are bringing the movement to the attention of this assembly in the hope that the methods upon which the gas industry depends for the distribution of information relating to its business may be modernized and conducted upon as high a plane as are the methods by which the Association develops and promotes the business of making gas and distributing it.

Value of Wide-spread Information

We are keenly aware of the difficulties encountered by the managements of gas companies throughout the country, in their corporate activities. Convinced that a partial or total misunderstanding of the gas company's business, the aims and purposes of its officials, and its service generally are the underlying cause of a large part of the difficulties of public utility service, we believe that an organized and properly conducted central bureau in the gas industry can operate to remove at least some of the confusion on the part of the general public, and we therefore feel that in urging this movement upon the attention of this assembly we are within the bounds of the general effort throughout the country for readjustment and reconstruction in all lines of essential industry.

The gas business is a highly technical undertaking. It requires special education and training for those who conduct the business and it is therefore logical to assume that some education must be provided and distributed among its prospective customers before anything approaching an understanding on the part of the general public can be realized. We believe it lies within the functions of this Association to provide the system by which such education may be undertaken.

It is an undertaking charged with unlimited possibilities; it will require carefully devised and most conscientiously executed plans to accomplish the ends we are seeking, but it must be very clear to everyone in this assembly that the possible results justify every effort we can make to achieve them.

If the Advertising and Publicity Section, which will be in the nature of a central publicity bureau for the gas industry of the United States, is established, it will be possible to provide from this source all the elements of a thorough education of the public on the subject of the gas business. Furthermore, it will be possible to bring into the sphere of the section's activities those individual gas companies that have been in the past struggling along without any means, or with inadequate means, for informing their communities of the character and advantages of gas service. No one will dispute the assertion that every gas company in this country needs an adequate advertising department. It should be one of the primary purposes of an Advertising and Publicity Section to see that this need is pursued without pause.

Aims of Section

If a central bureau is authorized and maintained by the Association for the development and promotion of information pertaining to the gas business, and if the gas companies generally are edu-

cated up to the importance of utilizing this information, then the principal aims of the advocates of the proposed section will have been accomplished.

To fulfill these aims we hope to build, by the consent of this assembly, an energetic, co-operative advertising and publicity bureau for the gas industry of the United States.

In considering its formation one very essential idea should be kept in mind. We must assume that the entire gas industry is a unit, similar in its operations to an individual gas company; for it is the industry as a whole which must create this bureau, or section, which must maintain it and which will receive whatever advantages may accrue from it.

We must also keep in mind the several departments of the gas industry the activities of each of which will be affected by the operation of this central bureau. The "department" of gas companies manufactures gas and undertakes to sell its products and its service over as wide a territory as its physical limitations permit. The "department" of appliance manufacturers produces the appliances and apparatus through which gas and gas service must necessarily be distributed. In these two departments we have the principal factors within the industry itself that are to be affected by the operations of the advertising and publicity bureau, although we must, at the same time, keep in mind that other very essential factor, the general public, which is the consumer in this case.

The relations existing between these three factors constitute the foundation upon which our business is built and we must constantly keep this fundamental triangle in mind when we approach the formation of a bureau which is to be the mouth-piece of two of the factors in addressing the third—the public—with such advertising and publicity matter as it may be deemed advisable to develop and distribute.

Co-operation Essential

The department of gas companies could not distribute its product and service without the co-operation of the appliance manufacturing department, nor can the public, or consuming department, be adequately informed of the service offered jointly by the other two unless these two co-operate closely in the development and distribution of information pertaining to their service. It is, therefore, highly desirable that in the formation of this proposed section the gas companies and the appliance manufacturers co-ordinate their efforts if the best results are to be achieved.

We may now group the gas company and appliance manufacturing departments as one unit and proceed on the theory that whatever advantageous information there is relating to the gas business, which is the business of the gas company and the appliance manufacturer, and not the business of the hardware dealer, furniture dealer or department store, should be disseminated as promptly and as widely as is possible within the limits of real economy. Undoubtedly we do possess highly advantageous and valuable information pertaining to our business, but its value to the gas industry or its departments, or to the consumer, is only in ratio with the scope and efficiency of its distribution among those to whom we undertake to sell gas and gas service. We might have information of the most vital character conceivable, but unless we convey it to our prospective customers in a systematic and impressive manner, it is of no value whatever to anyone. Unless we convey it beyond our own forces, we are in precisely the same situation as the

inventor who develops a great labor-saving and money-making machine and keeps it locked in his cellar without telling the world of his discovery. In both cases, the product of great labor and expense falls to rust and ruin and no one is benefited by it.

Value of Advertising Proved

We know that, in the past, the gas industry generally has attempted, only in spasmodic and widely separated efforts, to tell its customers, its prospective customers and its communities of the advantages of its service and the reasons for its existence. There has been no attempt at constructive education of the public from a central bureau or any organized source within the industry. We know, also, that in whatever locality the attempt has been, the results have been most satisfactory and the justification of the effort and expense is very clear before us. It is an established fact that the gas company that has maintained an adequate advertising and publicity department has not only promoted and extended its business and its service, but it has obtained and now enjoys, in nearly every instance, the good will, respect and confidence of the citizens in its community. It is this knowledge that urges on the advocates of an A. G. A. Advertising and Publicity Section which will function for the industry as a whole in a manner similar to the advertising department of a successful and highly esteemed public utility company. If the section is authorized and the necessary machinery set in motion, there can be no more doubt as to the satisfactory results to accrue from it for the industry than now exists concerning the results achieved by the advertising departments of the gas companies of New York, Baltimore, St. Louis, Philadelphia, Denver and others well known to members here to-day.

In regard to the authority for our project, it rests now with the members of this body to say whether the Association officers and directors shall proceed at this time. You are about to vote the central advertising and publicity bureau into existence or crush the idea.

Former Association Efforts

There may be some members here present who feel that the work of the Association along the lines of advertising and publicity may be carried on in a manner similar to that which prevailed in the organization of the National Commercial Gas Association. To these members, I would point out the difficulties of adequately maintaining such work as encountered by the N. C. G. A.

The advertising committee in that body was composed of very able men, but their time and their energies were devoted to Association work purely as a side issue, during moments they were able to snatch from their company duties. Members had to be summoned from all sections of the country whenever a meeting of the committee was held and only a few were able to attend. There was no definite policy outlined for the advertising committee to proceed upon; there was very little money provided and no one was responsible in any manner to the Association or to anyone else for the accomplishment of results. It was a haphazard attempt at best and it was only natural that the advertising and publicity promoted through this medium was not effective and not sufficiently impressive to convince even the gas company managers themselves either as to the advisability of paying for it or for its distribution.

I believe every member here present will agree, upon mature consideration, that the work of advertising and publicity in this industry is of importance

sufficient to warrant a special organization within the Association to conduct it, with a responsible executive head, under salary; with ample funds to carry on its operations, and with experienced gas men on the managing committee, whose duty it will be to oversee and guide the activities of the bureau.

Details of Organization

In regard to the machinery necessary to make the bureau an effective factor in the development of the gas business, it is hardly necessary at this time to go into details. It appears a problem with few difficult phases, none of which is insurmountable. Once this body authorizes the formation of the bureau, the advertising and publicity men of both gas companies and manufacturers, already active in the Association, might be incorporated as members. With the nucleus of a membership thus formed, and with a suitable chairman and managing committee appointed, active operations could begin with the selection of the secretary.

The burden of operation would naturally rest largely upon the shoulders of the secretary, who must assume the responsibilities for the success of the bureau's undertakings and for its value to the company members. It is manifestly necessary, therefore, that considerable care be exercised in the selection of the man for this office. He should be a man qualified to understand and to promulgate the aims, purposes and business principles of a public utility. Unless he understands this fundamental task, he cannot properly inform the consuming public or the citizens of a community on the subjects it embraces. He must understand the delicate relations existing between the public utilities and the people served by them. He should know by experience the relations that now exist and always will exist between the corporation and the civic authorities and individuals in a community. He should have at least a working knowledge of the conditions existing in different sections of the country so that the bureau may construct and distribute information designed to meet local conditions so far as it is practically possible. He should have both knowledge and experience in devising and distributing attractive and effective advertising and publicity matter, and finally he should be a man of such character that the individual company managements would have confidence both in his ability and his judgment in the responsible position he is to assume. With the machinery of this bureau properly organized and a man of this caliber in active executive control, we should have every reason to believe that the business of the gas industry in every department would be materially advanced.

I feel it is not necessary at this time to go into the discussion of the value of advertising and publicity as a business proposition. It is hardly conceivable that one of our members, after any considerable experience in the gas industry, can seriously doubt the advantages to be derived from the adequate distribution of information about our business, or can fail to foresee the disadvantages consequent upon a lack of such information.

I merely suggest, in the possibility that someone here may feel that we are making too much of this movement, that we consider the strained relations now existing between certain gas companies in this country and the citizens and authorities of the communities they serve, relations undeniably due to the absence of information about those companies, their business, service and character and the advantages they offer to their communities in return for the franchises they enjoy. Their rates are involved, their

service is attacked and their very existence as private corporations threatened.

I do not mean to say that advertising and publicity would eradicate all the evils now besetting the operation of the gas company in a community infested with uninformed or unprincipled politicians and others whose special interests lead them persistently to attack public service corporations, but I do maintain that the dissemination of correct and adequate information in a systematic manner, under a plan such as might be devised by this proposed central bureau, would immediately have an effect in offsetting false statements and undeserved criticisms with which the public mind has been permitted to be filled.

I do not hesitate to predict that eventually the activities of the bureau, if it is established, will very largely eliminate most of the evils arising from misinformation or total ignorance of the gas business and its advantages, or of the character of the companies conducting it.

If the Association membership believes that the business of manufacturing and distributing gas is promoted by the activities of established sections whose energies are specially turned in that direction, can it doubt that the equally essential work of developing and distributing information will be similarly facilitated and promoted by a special section created for the purpose?

And can it doubt that largely increased sales of gas and gas appliances and the steady growth of respect and confidence will result from better understanding and more cordial relations?

We are at a very critical period in the life of the gas industry. The readjustment stage of business in this country is still pressing heavily upon us. We must either readjust our business to meet the new conditions or we must go on with the old pre-war conditions and be classed as out of date and non-progressive. We certainly cannot afford that classification, and one of the methods by which we may readily convince the people we serve that we belong in the class of modern, active, highly essential and honorable industries is to proclaim our public service in the strongest terms and by means of the most effective methods available.

Effect Upon Association

Again, the establishment of this proposed Advertising and Publicity Section would add another very attractive item to the list of advantages which the Association offers gas companies as inducements for membership. If we take action here and now, authorizing the establishment of a central advertising bureau, we may feel sure that those companies not already enrolled as members in the Association will look with great interest on the value of a membership which includes a systematic supply of publicity suggestions from the best talent in the industry. One of the difficulties encountered by the average small company in its operations is the cost of adequate publicity, to say nothing of the scarcity of talent from which to procure such matter. It may be readily seen, therefore, that membership in the Association, carrying with it the inexpensive but highly effective product of a central bureau of advertising and publicity, would be a very attractive proposition to any company management, no matter how small its territory.

Section as Aid

It is not the aim of advocates of this proposed section to make it the sole source of advertising and publicity in the industry. What we propose is a bureau competent to develop and distribute to gas companies all the necessary data re-

lating to the gas business as a public service; competent also to co-operate with and to advise such publicity representatives as the local gas companies may appoint to receive and distribute the products of the bureau. Under this method it will still remain with the companies to secure space in their local mediums and to initiate, as often as they may desire, educational and advertising campaigns. But with this proposed bureau in operation any company member of the Association would know where to turn when advertising and publicity plans are contemplated and advice or assistance is needed. This, of course, would be in addition to the broad, general work carried on continuously by the central bureau, as already outlined.

There was a period in the history when gas, our product, was so highly prized by its manufacturer that its single outlet was enclosed in a museum and an admission price charged to see it burn. A year or so ago we celebrated the centennial anniversary of that period. We have advanced, in respect to time, a hundred years from that period. Let us now determine to keep just as far ahead of the museum idea in respect to methods as to time. Let us prepare now to take our business out into the community by means of the printed word, and endeavor to sell our services on broad, established business principles, as all other essential commodities in this country are sold—through the powerful aid of adequate advertising and publicity.

I think I can foresee very clearly the new gas industry which this Association is striving to develop upon its pre-war foundations. I know that already—within four brief months after the close of a colossally expensive world war—the Association's activities and plans have encouraged and revitalized many company units and individuals throughout the country. From my central viewpoint at Chicago, I can daily see constantly growing evidences of new life and new hope springing up everywhere in our industry. I speak conservatively when I assert that the gas industry is coming up out of the cyclone cellar; and it is coming up seeking new pathways of progress and creating new ideals to light its forward way.

The advocates of this proposed Advertising and Publicity Section sincerely believe that this regenerated industry, holding steadily to its new ideals, will be materially advanced if the American Gas Association adopts this proposal and proceeds in the future to give the public all the information the industry may possess concerning gas service and its advantages.

Obituary

William D. Kelley, General Superintendent of Meters of the Consolidated Gas Company of New York and an employee of the company for the past 41 years, died on April 12, at his home in Mount Vernon, from heart disease. Mr. Kelley was born in New York in 1856. He was a member of the Society of Mechanical Engineers, the Society of Gas Engineering and the American Gas Association. His two sons, Capt. J. W. Kelley of the Fifteenth Field Artillery and Private W. D. Kelley, Jr., of the 112th Field Artillery, are both with the Army of Occupation.

Registration at the Special Executive and General Session of the American Gas Association

Hotel Astor, New York, N. Y., March 13-14, 1919

Company Members Registered—Represented by Delegate

Baltimore Enamel & Novelty Co., Baltimore, Md.—J. G. Daneker
W. W. Barnes, East Orange, N. J.—W. W. Barnes
The Bartlett Hayward Co., Baltimore, Md.—John A. Mason
The Bronx Gas & Electric Co., New York, N. Y.—E. H. Rosenquest
Camden Iron Works, Camden, N. J.—E. F. Miller
Chuctanunda Gas Light Co., Amsterdam, N Y.—O. A. Merchant, Jr.
James B. Clow & Sons, Chicago, Ill.—E. V. Daily
Consolidated Gas Co. of New York, New York, N. Y.—W. R. Addicks
Consolidated Gas, Elec. Lt. & Power Co., Baltimore, Md.—Charles M. Cohn
William M. Crane Co., New York, N. Y.—Wm. M. Crane
Cruse-Kemper Co., Ambler, Pa.—S. E. Fairchild, Jr.
Derby Gas Co., Derby, Conn.—George H. Scranton
Detroit Stove Works, Detroit, Mich.—H. D. Schall
B. F. Drakenfeld & Co., Inc., New York, N. Y.—M. F. Plage
Eclipse Gas Stove Co., Rockford, Ill.—George D. Roper
Equitable Meter Co., Pittsburgh, Pa.—O. F. Felix
Fulton County Gas & Elec. Co., Gloversville, N. Y.—L. C. Smith
The Gas Machinery Co., Cleveland, Ohio—W. E. Steinwedell
General Briquetting Co., New York, N. Y.—J. B. McGraw
General Fire Extinguisher Co., Providence, R. I.—George S. Barrows
John J. Griffin & Co., Philadelphia, Pa.—W. Griffin Gribbel
Humphrey Co., Kalamazoo, Mich.—F. A. Lemke
Isbell-Porter Co., Newark, N. J.—John S. DeHart, Jr.
Kidde & Co., New York, N. Y.—R. Kidde
Long-Landreth-Schneider Co., New Brunswick, N. J.—H. J. Long
Lynchburg Traction & Light Co., Lynchburg, Va.—J. W. Hancock
Maryland Meter Works, Baltimore, Md.—Edmund S. Dickey
The Michigan Stove Co., Detroit, Mich.—L. B. Young
Nassau & Suffolk Lighting Co., New York, N. Y.—George MacDonald
Nathaniel Tufts Meter Works, Boston, Mass.—H. A. Norton
Northern Liberties Gas Co., Philadelphia, Pa.—J. M. Ruegenberg
Parker-Russell Mining & Mfg. Co., St. Louis, Mo.—Leigh Wickham
Penn Central Light & Power Co., Lewistown, Pa.—F. P. Duggan
Pittsburgh Water Heater Co., Pittsburgh, Pa.—F. H. Knapp
Pittsfield Coal Gas Co., Pittsfield, Mass.—H. C. Crafts
The Roberts Brass Mfg. Co., Detroit, Mich.—Earl W. Roberts
Ruud Mfg. Co., Pittsburgh, Pa.—A. P. Brill
Shapiro & Aronson, Inc., New York, N. Y.—N. W. Belmuth
Sprague Meter Co., Bridgeport, Conn.—W. P. Hutchinson
The Stacey Bros. Gas Const. Co., Cincinnati, Ohio—W. S. Guitteau
The Stacey Mfg. Co., Cincinnati, Ohio—Wm. F. Dunker
Tate-Jones & Co., Inc., New York, N. Y.—L. B. Richards
Twin State Gas & Elec. Co., Boston, Mass.—Howard L. Olds
United Lead Co., New York, N. Y.—H. B. Coho
Washtenaw Gas Co., Ann Arbor, Mich.—Henry W. Douglas
Welsbach Co., Gloucester, N. J.—Charles W. Wardell

Individual Members and Committeemen

Abell, H. C., Detroit City Gas Co., New York, N. Y.
Africa, Walter G., The Peoples Gas Light Co., Manchester, N. H.
Aikin, H. C., Eclipse Gas Stove Co., Chester, Pa.
Alexander, S. H., Public Service, N. J., Newark, N. J.
Almberg, H. E., Cons. Gas Co. of N. Y., New York, N. Y.
Althen, George R., Cons. Gas, Elec. Lt. & Pr. Co., Baltimore, Md.
*Andersen, H. B., United Gas Improvement Co., Philadelphia, Pa.
Atwood, C. C., Brooklyn Union Gas Co., Brooklyn, N. Y.
Azoy, A. C. M., Berwind-White Coal Mining Co., New York, N. Y.
Barnes, Albert M., Cambridge Gas Light Co., Cambridge, Mass.
Barnitz, F. R., Cons. Gas Co. of N. Y., New York, N. Y.
Bartel, Emil J., Brooklyn Union Gas Co., Brooklyn, N. Y.

* Non-member—admitted by virtue of employment by Company Member.

Barthold, W. H., Commonwealth Pr., Ry. & Lt. Co., New York, N. Y.
Bartholomew, R. A., Ruud Mfg. Co., New York, N. Y.
Beadenkopf, George, Cons. Gas, Elec. Lt. & Pr. Co., Baltimore, Md.
Berry, Walter M., Bureau of Standards, Washington, D. C.
Bowery, J. C., Pittsburgh Water Heater Co., Pittsburgh, Pa.
Boyd, Albert M., United Gas Improvement Co., Philadelphia, Pa.
Bradley, W. H., Consolidated Gas Co., New York, N. Y.
Brown, R. B., Milwaukee Gas Lt. Co., Milwaukee, Wis.
Buerkle, W. A., W. A. Buerkle, Brooklyn, N. Y.
Carter, Robert A., Jr., Consolidated Gas Co., New York, N. Y.
Cauley, F. F., Peoples Gas Lt. & Coke Co., Chicago, Ill.
Chapin, C. H. B., Empire State Gas & Elec. Assn., New York, N. Y.
Christmas, H. N., Wm. M. Crane Co., New York, N. Y.
Chubb, C. N., Peoples Light Co., Davenport, Iowa
Clabaugh, Albert, Public Service Gas Co., Englewood, N. J.
Clark, H. H., Public Service Co., Chicago, Ill.
Clark, J. C. D., Boston Cons. Gas Co., Boston, Mass.
Clark, Walton, United Gas Improvement Co., Philadelphia, Pa.
Clark, Wm. J., Westchester Ltg. Co., Mt. Vernon, N. Y.
Conroy, J. P., General Gas Light Co., New York, N. Y.
Corbus, F. G., Welsbach Co., Gloucester, N. J.
Crawford, R. P., Baltimore Gas Appliance & Mfg. Co., Philadelphia, Pa.
Crowell, J. K., Westchester Lighting Co., Mt. Vernon, N. Y.
Cutcheon, F. R., Cons. Gas Co. of N. J., Long Branch, N. J.
Dodson, Herbert K., Cons. Gas, Elec. Lt. & Pr. Co., Baltimore, Md.
Dorchester, Paul, Surface Combustion Co., New York, N. Y.
Doull, R. S., Consolidated Gas Co., New York, N. Y.
Douglas, James B., United Gas Improvement Co., Philadelphia, Pa.
Dunn, Frank S., Municipal Gas Co., Albany, N. Y.
Dutton, L. R., Phila. Suburban Gas & Elec. Co., Jenkintown, Pa.
Eddison, W. Barton, Surface Combustion Co., New York, N. Y.
Ehlers, W. A., American Gas Association, New York, N. Y.
Elcock, Thomas R., Jr., United Gas Improvement Co., Philadelphia, Pa.
Evans, O. B., United Gas Improvement Co., Philadelphia, Pa.
Eves, Philmer, New Haven Gas Light Co., New Haven, Conn.
Forstall, Alfred E., Forstall & Robison, New York, N. Y.
Forstall, Walton, Philadelphia Gas Works, Philadelphia, Pa.
Fox, Clifford S., East River Gas Co. of L. I. C., Long Island City, N. Y.
Frueauff, Frank W., Denver Gas & Elec. Lt. Co., New York, N. Y.
Fulweiler, W. H., United Gas Improvement Co., Philadelphia, Pa.
Geist, Carlton, Atlantic City Gas Co., Atlantic City, N. J.
Gifford, N. W., East Boston Gas Co., East Boston, Mass.
Gould, William, Gas & Elec. Improvement Co., Boston, Mass.
Grady, Stanley, Roberts & Mander Stove Co., Philadelphia, Pa.
Griswold, Robert G., H. L. Doherty & Co., New York, N. Y.
Haight, W. H., Public Service Gas Co., Hackensack, N. J.
Halsey, W. M., Public Service Gas Co., Newark, N. J.
Hare, J. B., Central Union Gas Co., New York, N. Y.
Harrington, W. K., American Meter Co., New York, N. Y.
Hewitt, Arthur, Consumers' Gas Co., Toronto, Canada
Higgins, A. A., Providence Gas Co., Providence, R. I.
Himsworth, H. H., Astoria Lt., Ht. & Pr. Co., Astoria, N. Y.
Holman, C. L., Laclede Gas Light Co., St. Louis, Mo.
Howes, R. A., Consolidated Gas Co., New York, N. Y.
Hunter, James F., Consolidated Gas Co., New York, N. Y.
Hunter, Wm. O., Baltimore Gas Appliance & Mfg. Co., Dorchester, Mass.
Jennings, R. J., Westchester Lighting Co., Mt. Vernon, N. Y.
Karshner, G. M., Consolidated Gas Co., New York, N. Y.
Kay, Frank L., Cons. Gas Co. of N. Y., New York, N. Y.
Kellogg, R. M., Westchester Lighting Co., Mt. Vernon, N. Y.
Kennedy, John Pendleton, Cambridge Gas Light Co., Cambridge, Mass.
Kennedy, James S., Standard Gas Lt. Co.'s Works, New York, N. Y.
Klumpp, J. B., United Gas Improvement Co., Philadelphia, Pa.
Knight, O. T., Peoples Gas Lt. & Coke Co., Chicago, Ill.
Lackersteen, E. C., Newtown Gas Co., Elmhurst, N. Y.
Lane, George A., Peoples Gas Lt. & Coke Co., Chicago, Ill.
Learned, W. A., Newton & Watertown Gas Lt. Co., Newton, Mass.
Lemoine, L. R., U. S. Cast Iron Pipe & Fdy. Co., Philadelphia, Pa.
Leonard, Charles F. (Consulting Engineer), New York, N. Y.

LeViness, T. W., Westchester Lighting Co., Mt. Vernon, N. Y.
Loebell, Henry O., Henry L. Doherty & Co., New York, N. Y.
Lyon, Howard, Welsbach Co., Gloucester, N. J.
MacArthur, D., Seaboard By-Product Coke Co., Jersey City, N. J.
Macbeth, G. T., Westchester Lighting Co., Mt. Vernon, N. Y.
McCleary, Wm., New York & Richmond Gas Co., New York, N. Y.
McCoy, Wm. P., Welsbach Co., Gloucester, N. J.
McKay, William E., New England Fuel & Trans. Co., Boston, Mass.
McLean, H. B., Consolidated Gas Co., New York, N. Y.
Millspaugh, George M., Rathbone, Sard & Co., New York, N. Y.
Miles, E. C., *Am. Gas Eng. Jour.*, New York, N. Y.
Miller, Carroll, Philadelphia Co., Pittsburgh, Pa.
Mockett, W. E., Havana Elec. Ry., Lt. & Pr. Co., Havana, Cuba
Morris, W. Cullen, Consolidated Gas Co., New York, N. Y.
Morrison, H. K., Lynn Gas & Elec. Co., Lynn, Mass.
Nichols, Carroll B., Westmoreland Coal Co., Philadelphia, Pa.
Nichols, Wm. B., Citizens Gas Light Co., Quincy, Mass.
Nute, Jos. E., Fall River Gas Works, Fall River, Mass.
Paige, Clifford E., Malden & Melrose Gas Lt. Co., Malden, Mass.
Parker, George W., Russell Engineering Co., St. Louis, Mo.
Pinkerton, C. S., Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Plantinga, P., The Gas Machinery Co., Cleveland, Ohio
Post, Alfred P., American Gas Co., Philadelphia, Pa.
Purcell, T. V., Peoples Gas Lt. & Coke Co., Chicago, Ill.
Randolph, Wm. W., Fayetteville Lt. & Pr. Co., Fayetteville, N. C.
Read, H. L., Surface Combustion Co., New York, N. Y.
Reinach, H. B., Consolidated Gas Co., New York, N. Y.
Reynolds, James F., Consolidated Gas Co., New York, N. Y.
Ritchie, A. R., Consolidated Gas Co., New York, N. Y.
Robbins, M. C., *Gas Age*, New York, N. Y.
Rogers, W. H., Public Service Gas Co., Paterson, N. J.
Root, Wm. A., Bronx Gas & Elec. Co., New York, N. Y.
Roper, Mabon P., Eclipse Gas Stove Co., Rockford, Ill.
Saul, Milt, *Gas Record*, Chicago, Ill.
Schutt, H. S., C. H. Geist Co., Philadelphia, Pa.
Shattuck, J. D., Phila. Suburban Gas & Elec. Co., Chester, Pa.
Shiebler, Marvin (Consulting Engineer), New York, N. Y.
Shreve, W. E., Public Service Gas Co., Camden, N. J.
Smart, Burton, Portland Gas Lt. Co., Portland, Me.
Smith, A. J., Concord Lt. & Pr. Co., Concord, N. H.
Smith, George E., Public Service Corp. N. J., Jersey City, N. J.
Smith, G. H., Central Hudson Gas & Elec. Co., Newburgh, N. Y.
Smith, John C., New York & Richmond Gas Co., Stapleton, N. Y.
Snow, William H., New Bedford Gas & Edison Lt. Co., New Bedford, Mass.
Starzenski, Victor, Mohawk Gas Co., Schenectady, N. Y.
Steinwedell, George, Binghamton Gas Works, Binghamton, N. Y.
Taussig, J. Hawley, U. G. I. Contracting Co., Philadelphia, Pa.
Tenney, Albert B., Malden & Melrose Gas Lt. Co., Boston, Mass.
Titzel, R. John, United Gas & Elec. Eng. Corp., New York, N. Y.
Turner, A. E., Consolidated Gas Co., New York, N. Y.
Uhlig, E. C., Brooklyn Union Gas Co., Brooklyn, N. Y.
Underhill, Henry L., Bartlett Hayward Co., Baltimore, Md.
Vincent, G. I., Syracuse Lighting Co., Syracuse, N. Y.
von Maur, Jacob D., Laclede Gas Light Co., St. Louis, Mo.
Weaver, H. O., Consolidated Gas Co., New York, N. Y.
Weber, F. C., Henry L. Doherty & Co., New York, N. Y.
Wehrle, George, Niagara Lt., Ht. & Pr. Co., Tonawanda, N. Y.
Welsh, William J., New York & Richmond Gas Co., Staten Island, N. Y.
Williams, C. C., Rathbone-Sard & Co., Albany, N. Y.
Willien, L. J., Chas. H. Tenney & Co., Boston, Mass.
Winterstein, C. C., United Gas Improvement Co., Philadelphia, Pa.
Wiske, P. B., Brooklyn Union Gas Co., Brooklyn, N. Y.
Wogan, F. R., Brooklyn Union Gas Co., Brooklyn, N. Y.
Wolff, A. H., Wolff Gas Radiator Co., New York, N. Y.
Woods, George E., Consolidated Gas Co., New York, N. Y.
Wright, Wm. H., Wilputte Coke Oven Corp., New York, N. Y.
Wrightington, E. M., Boston Cons. Gas Co., Boston, Mass.
Xylander, Peter, Public Service Gas Co., Hackensack, N. J.
Zingg, J. P., Public Service Gas Co., Orange, N. J.

Guests and Visitors Present

Andersen, J. B., Brockton Gas Light Co., Brockton, Mass.
Beebee, A. M., Rochester Ry. & Light Co., Rochester, N. Y.
Bees, Joseph, Hyde Park Gas Co., Scranton, Pa.
Bigelow, A. C., *Gas Industry*, Buffalo, N. Y.
Brayshaw, E. Russell, Brayshaw Furnaces & Tools Co., Manchester, Eng.
Cadwallader, L. L., Waterbury Gas Lt. Co., Waterbury, Conn.
Causbrook, W. R., Public Service Co., Plainfield, N. J.
Coles, S. S., Westchester Lighting Co., Mt. Vernon, N. Y.
Cornine, Marshall, Standard Gas Light Co., New York, N. Y.
Curfman, F. G., Improved Equipment Co., New York, N. Y.
Davis, Edward F., Maxon Premix Burner Co., Muncie, Ind.
Dillon, E. P., Research Corp., New York, N. Y.
Drake, Francis E., Lynn Gas & Elec. Co., Lynn, Mass.
Earle, W. H., Rochester Ry. & Light Co., Rochester, N. Y.
Egbert, H. D., Research Corp., New York, N. Y.
Evans, F. J., Surface Combustion Co., New York, N. Y.
Harris, William J., Surface Combustion Co., New York, N. Y.
Hellen, Frank, Rochester Ry. & Light Co., Rochester, N. Y.
Housel, James L., Public Service Gas Co., South Amboy, N. J.
Jayne, D. V., The Barrett Co., New York, N. Y.
Lambert, Wm., *The Gas Age*, New York, N. Y.
Landis, H. K., *The Gas Age*, New York, N. Y.
Leslie, R. W., Surface Combustion Co., New York, N. Y.
Lewars, C. E., Semet-Solvay Co., Syracuse, N. Y.
Lunn, Charles A., U. S. Army, New York, N. Y.
MacSweeney, J. P., Rochester Ry. & Light Co., Rochester, N. Y.
Meston, A. F., Research Corp., New York, N. Y.
Miller, William, Stacey Bros. Gas Cons. Co., Cincinnati, Ohio
Offutt, M. Webb, MacThwaite Oil & Gas Co., Ada, Okla.
O'Neill, Eugen W., New York & Richmond Gas Co., Stapleton, N. Y.
Oswald, Edwin H., Hoffman Heater Co., New York, N. Y.
Pease, W. T., Ruud Mfg. Co., Boston, Mass.
Quinn, A. K., Newport Gas Light Co., Newport, R. I.
Savoge, Frank J., Ruud Mfg. Co., New York, N. Y.
Schoch, Henry K., General Briquetting Co., New York, N. Y.
Sellman, N. T., Consolidated Gas Co., New York, N. Y.
Smith, George A., New York & Richmond Gas Co., Stapleton, N. Y.
Spear, M. H., Ordnance Dept., U. S. A., New York, N. Y.
West, William H., General Gas Light Co., Allston, Mass.
Westermaier, F. V., Welsbach Street Ltg. Co. of Am., Philadelphia, Pa.
Whitney, W. N., Rochester Ry. & Light Co., Rochester, N. Y.
Wolff, M. S., A. H. Wolff Gas Radiator Co., New York, N. Y.

Engineering Information

THE Engineering Council announces the inauguration of a new service which is to be available to all engineers and engineering societies of the United States. It is recognized that the United States has accumulated, through its research and investigation bureaus, a valuable supply of engineering information, much of which is still unpublished. Under present conditions information can only be secured by engineers provided they know what is available, and to whom application should be made. Often the bureau officials can do nothing but forward published reports in which a mass of data of no interest to the inquirer submerges the information sought.

The new information service, under the direction of engineers, proposes to answer the engineer's question exactly, briefly, definitely, by making abstracts or compilations from reports.

The National Service Committee will also review legislative and departmental events of interest to engineers, and prepare bulletins for general publication.

The Engineering Council cordially invites members of the gas industry who are concerned with engineering problems to make use of this service, and announces that Mr. M. O. Leighton, Chairman of the National Service Committee, can be reached at the offices of the Council, 10th and G Streets, N. W., Washington, D. C.

New Members Enrolled in the American Gas Association March 1-31, 1919, Inclusive.

HOLDING COMPANY MEMBERS

American Light & Traction Co.....Emerson McMillin, New York, N. Y.

GAS COMPANY MEMBERS

Detroit City Gas Co.....C. W. Bennett, Detroit, Mich.
Grand Rapids Gas Light Co.....John T. Young, Grand Rapids, Mich.
Muskegon Traction & Lighting Co.....Walter L. Eyke, Muskegon, Mich.
St. Paul Gas Light Co.....F. L. Cross, St. Paul, Minn.
South St. Paul Gas & Electric Co.....Dean W. Flowers, So. St. Paul, Minn.
St. Joseph Gas Co.....V. L. Elbert, St. Joseph, Mo.
Consolidated Gas Co. of N. J.....F. R. Cutcheon, Long Branch, N. J.
Binghamton Gas Works .....George Steinwedell, Binghamton, N. Y.
Mauch Chunk Gas Co.....A. E. Forstall, Mauch Chunk, Pa.
San Antonio Public Service Co.....W. B. Tuttle, San Antonio, Tex.
Madison Gas & Electric Co.....John St. John, Madison, Wis.
Milwaukee Gas Light Co.....S. J. Glass, Milwaukee, Wis.
Wauwatosa Gas Co. .....E. Haase, Wauwatosa, Wis.
West Allis Gas Co.....R. B. Brown, West Allis, Wis.

MANUFACTURING COMPANY MEMBERS

Bartlett & Co., Inc.....C. Edwin Bartlett, Philadelphia, Pa.
Gas Machinery Co., The.....W. E. Steinwedell, Cleveland, Ohio.
Geist Mfg. Co. .....Carlton Geist, Atlantic City, N. J.
Enamel Products Co., The.....J. Foster, Jr., Cleveland, Ohio.
Improved Equipment Co., The.....A. F. Traver, New York, N. Y.
D. McDonald & Co.....Donald McDonald, Albany, N. Y.
National Tube Co. .....W. L. Schaeffer, Pittsburgh, Pa.
Parker Russell Mining & Mfg. Co.....Leigh Wickham, St. Louis, Mo.
Standard Brass Works .....H. R. Brownell, Detroit, Mich.
Union Steel Products Co.....George E. Dean, Albion, Mich.
Addressograph Co. .....R. N. Fellows, Chicago, Ill.
Connelly Iron Sponge & Governor Co.....S. F. Hayward, New York, N. Y.

Active Members

ALABAMA

U. S. Nitrate Plant No. 1, Sheffield
Harold W. Hunt

CALIFORNIA

Pacific Gas & Elec. Co., San Francisco
Lee H. Newbert

ILLINOIS

R. Williamson & Co., Chicago
Charles E. Ummach

INDIANA

By-Products Coke Corp., Indiana Harbor
R. C. Downing

MASSACHUSETTS

Nathaniel Tufts Meter Works, Boston
Norton McKean
Arthur E. Norton

NEW JERSEY

Consolidated Gas Co. of N. J., Long Branch
Irving H. Black
L. E. Dequines
Public Service Gas Co., Orange
J. P. Zingg

NEW YORK

East River Gas Co., Long Island City
Clifford S. Fox
American Light & Traction Co., New York
Alanson P. Lathrop
Consolidated Gas Co., New York
Robert E. Livingston
Roger S. McCoy
C. Schmidt
Henry L. Doherty & Co., New York
G. R. Trumbull
National Tube Co., New York
Cornelius F. Roland
W. S. Rockwell Co., New York
Joseph A. Doyle

OHIO

Bryant Heater & Mfg. Co., Cleveland
C. L. Bryant

PENNSYLVANIA

Bartlett & Co., Inc., Philadelphia
Duncan A. Worrell
Ruud Mfg. Co., Pittsburgh
Charles I. Baker

CANADA

Ottawa Gas Co., ,Ottawa, Ont.
A. A. Dion

Applicants for Space at October Exhibition

THE success of the First Annual Convention and Exhibition of the American Gas Association to be held on October 13-18, at the Hotel Pennsylvania, New York, N. Y., is amply guaranteed by the list of companies that have already applied for space on the exhibition floor.

The Manufacturers' Section mailed to all member manufacturer companies, during the first week in April, a broadside containing all necessary preliminary information about the exhibit. A cut of the floor of the exhibition room showed 85 spaces, on the main floor and balcony and in the foyer. Of these 50 have already been applied for, by the companies named in the following list.

A pamphlet of final instructions and suggestions for exhibitors is being prepared and will be mailed as soon as the spaces have been definitely allotted according to the arrangements of the Exhibition Committee.

There can be little doubt that the gas industry is awake to the need and opportunity for renewed activity, for the pulse of the industry as a whole is often accurately read in the attitude of the manufacturing companies, who in this case have lost no time to make application for space although the exhibition is yet six months away.

The progress of the Section's campaign for new members will be found in the list published on page 228 of this issue.

Exhibitors—Exhibition of Appliances
Hotel Pennsylvania

American Stove Co.—New Process Stove Co. Div., Cleveland, Ohio
American Stove Co.—Geo. M. Clark & Co. Div., Chicago, Ill.
American Meter Co., New York, N. Y.
A-B Stove Co., Battle Creek, Mich.
G. S. Blodgett Co., Burlington, Vt.
Will W. Barnes, East Orange, N. J.
Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
Bryant Heater & Mfg. Co., Cleveland, Ohio
James B. Clow & Sons, Chicago, Ill.
Crandall Pettee Co., New York, N. Y.
William M. Crane Co., New York, N. Y.
Cleveland Heater Co., Cleveland, Ohio
Connelly Iron Sponge & Governor Co., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Eclipse Gas Stove Co., Rockford, Ill.
The Estate Stove Co., Hamilton, Ohio.
Equitable Meter Co., Pittsburgh, Pa.
General Fire Extinguisher Co., Providence, R. I.
General Gas Light Co., New York, N. Y.
General Gas Appliance Co., New York, N. Y.
Humphrey Co., Kalamazoo, Mich.
The Hoffman Heater Co., Lorain, Ohio
Improved Appliance Co., Brooklyn, N. Y.
Long-Landreth-Schneider Co., New Brunswick, N. J.
Lawson Mfg. Co., Pittsburgh, Pa.
Lattimer Stevens Co., Columbus, Ohio.
Michigan Stove Co., Detroit, Mich.
Minneapolis Heat Regulator Co., Minneapolis, Minn.
The Mead Gas Heater Co., Delawanna, N. J.
National Tube Co., Pittsburgh, Pa.
Ofeldt & Sons, F. W., Nyack, N. Y.
Pittsburgh Water Heater Co., Pittsburgh, Pa.
The Peninsular Stove Co., Detroit, Mich.
Ruud Mfg. Co., Pittsburgh, Pa.
Roberts & Mander Stove Co., Philadelphia, Pa.
Reznor Mfg. Co., Mercer, Pa.
Rathbone, Sard & Co., Albany, N. Y.
Roberts Brass Mfg. Co., Detroit, Mich.
B. Ryan & Co., New York, N. Y.
Sprague Meter Co., Bridgeport, Conn.
Safety Gas Lighter Co., Haverhill, Mass.
Superior Meter Co., Brooklyn, N. Y.
Shapiro & Aronson, Inc., New York, N. Y.
The Surface Combustion Co., New York, N. Y.
Strauss Gas Iron Co., Philadelphia, Pa.
United Lead Co., New York, N. Y.
Union Stove Works, New York, N. Y.
Union Steel Products, Ltd., Albion, Mich.
Welsbach Co., Gloucester, N. J.
Weir Stove Co., Taunton, Mass.

Classified Directory--Manufacturers of Gas Equipment

Company Members Only, American Gas Association

ARC LAMPS (Gas)
- General Gas Light Co., New York, N. Y., and Kalamazoo, Mich.
- Welsbach Co., Gloucester, N. J.

BENCH IRON WORK
- Gas Machinery Co., Cleveland, Ohio
- The Bartlett Hayward Co., Baltimore, Md.
- The Improved Equipment Co., 60 Wall St., New York, N. Y.
- The Parker-Russell Mining & Mfg. Co., St. Louis, Mo.
- The Stacey Mfg. Co., Cincinnati, Ohio

BOILERS (Gas)
- Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
- General Gas Appliance Co., 103 Park Ave., New York, N. Y.
- Kidde & Co., 169 Chambers St., New York, N. Y.
- F. W. Ofeldt & Sons, Nyack, N. Y.
- The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.

BOILERS (Gas for House Heating)
- Kidde & Co., 169 Chambers St., New York, N. Y.

BOILERS (Waste Heat)
- The Bartlett Hayward Co., Baltimore, Md.

BLOWERS, BOOSTERS, EXHAUSTERS
- Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
- Gas Machinery Co., Cleveland, Ohio
- The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
- The C. M. Kemp Mfg. Co., Baltimore, Md.
- The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.

BRAZING TABLES
- Rathbone, Sard & Co., Albany, N. Y.
- The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.

BROILERS (Hotel)
- Rathbone, Sard & Co., Albany, N. Y.
- The Michigan Stove Co., Detroit, Mich.

BURNERS (Industrial)
- Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
- Equitable Meter Co., Pittsburgh, Pa.
- General Fire Extinguisher Co., Providence, R. I.
- General Gas Appliance Co., 103 Park Ave., New York, N. Y.
- International Hale Gas Mixer Co., Providence, R. I.
- Tate-Jones & Co., Inc., 50 Church St., New York, N. Y.
- The Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
- The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
- The C. M. Kemp Mfg. Co., Baltimore, Md.
- The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.

BURNERS (Lighting)
- American Meter Co., Inc., 105 W. 40th St., New York, N. Y.
- Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
- General Gas Light Co., New York, N. Y., and Kalamazoo, Mich.
- Lindsay Light Co., New York, N. Y., and Chicago, Ill.
- Welsbach Co., Gloucester, N. J.

BY-PRODUCT OVENS
- By-Product Coke Corp., Chicago, Ill.
- Semet-Solvay Co., Syracuse, N. Y.
- The Parker-Russell Mining & Mfg. Co., St. Louis, Mo.

BY-PRODUCT RECOVERY APPARATUS
- Gas Machinery Co., Cleveland, Ohio
- Isbell-Porter Co., Newark, N. J.
- The Bartlett Hayward Co., Baltimore, Md.

CALORIMETERS
- American Meter Co., Inc., 105 W. 40th St., New York, N. Y.
- D. McDonald & Co., Albany, N. Y.
- Maryland Meter Works, Baltimore, Md.
- Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.

CASING, TUBING (Steel)
- National Tube Co., Frick Bldg., Pittsburgh, Pa.

CHARGING COAL
- Gas Machinery Co., Cleveland, Ohio
- The Bartlett Hayward Co., Baltimore, Md.

COAL AND COKE (Conveyors, Crushers, Screeners)
- R. H. Beaumont Co., 315 Arch St., Philadelphia, Pa.
- The Bartlett Hayward Co., Baltimore, Md.

COCKS (Ranges, Water Heaters, Service and Meter)
- Hays Mfg. Co., Inc., Erie, Pa.
- H. Mueller Mfg. Co., New York, N. Y., and Decatur, Ill.
- Standard Brass Works, Detroit, Mich.
- The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
- The Roberts Brass Mfg. Co., Detroit, Mich.

COMPRESSORS
The C. M. Kemp Mfg. Co., Baltimore, Md.
The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.

CONDENSERS
Camden Iron Works, Camden, N. J.
Cruse-Kemper Co., Ambler, Pa.
Gas Machinery Co., Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
The Bartlett Hayward Co., Baltimore, Md.
The Stacey Mfg. Co., Cincinnati, Ohio
The Stacey Bros. Gas Construction Co., Cincinnati, Ohio
Steere Engineering Co., Detroit, Mich.

COOKING AUXILIARIES
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
The G. S. Blodgett Co., Burlington, Vt.

COUPLINGS
S. R. Dresser Mfg. Co., Bradford, Pa.

CYLINDERS (Pressure)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

DECALCOMANIA PRODUCTS
The Meyercord Co., Inc., Chamber of Commerce Bldg., Chicago, Ill.

EXCHANGERS (Heat)
The Bartlett Hayward Co., Baltimore, Md.

EXPERT APPRAISAL
Steere Engineering Co., Detroit, Mich.

EXTRACTORS (Tar, Dust, Fumes)
The Bartlett Hayward Co., Baltimore, Md.

FITTINGS
Will W. Barnes, 31 Chelsea Place, East Orange, N. J.
S. R. Dresser Mfg. Co., Bradford, Pa.
Eriez Stove & Mfg. Co., Erie, Pa.
Gas Machinery Co., Cleveland, Ohio
General Fire Extinguisher Co., Providence, R. I.
Kitson Co., 2827 Oakford St., Philadelphia, Pa.
H. Mueller Mfg. Co., New York, N. Y., and Decatur, Ill.
Shapiro & Aronson, Inc., 20 Warren St., New York, N. Y.
Standard Brass Works, Detroit, Mich.
The Roberts Brass Mfg. Co., Detroit, Mich.
Welsbach Co., Gloucester, N. J.

FITTINGS (Malleable Iron)
Stanley G. Flagg & Co., 1421 Chestnut St., Philadelphia, Pa.

FLEXIBLE TUBING
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Titeflex Metal Hose Corp., Badger Ave., Newark, N. J.

FLASHLIGHTS AND BATTERIES
Will W. Barnes, 31 Chelsea Place, East Orange, N. J.

FUEL BRIQUETTING
General Briquetting Co., 25 Broad St., New York, N. Y.

FURNACES
Eriez Stove & Mfg. Co., Erie, Pa.
Geist Mfg. Co., Atlantic City, N. J.
Tate-Jones & Co., Inc., 50 Church St., New York, N. Y.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
The Parker-Russell Mining & Mfg. Co., St. Louis, Mo.
The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.

GAS ENGINES
The Bartlett Hayward Co., Baltimore, Md.
United Lead Co., 111 Broadway, New York, N. Y.

GAS ENGINE COCKS AND VALVES
Standard Brass Works, Detroit, Mich.

GAS IRONS
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Strauss Gas Iron Co., Philadelphia, Pa.

GAS MIXERS
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eriez Stove & Mfg. Co., Erie, Pa.
Geist Mfg. Co., Atlantic City, N. J.
General Fire Extinguisher Co., Providence, R. I.
Hays Mfg. Co., Inc., Erie, Pa.
Improved Appliance Co., Inc., 419 Kent Ave., Brooklyn, N. Y.
International Hale Gas Mixer Co., Providence, R. I.
Strait & Richards, Inc., Newark, N. J.
Tate-Jones & Co., Inc., 50 Church St., New York, N. Y.
The C. M. Kemp Mfg. Co., Baltimore, Md.
The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.

GAS PLANTS (Blue)
The Bartlett Hayward Co., Baltimore, Md.

GAS PLANTS (Carbureted Water)
Gas Machinery Co., Cleveland, Ohio
The Bartlett Hayward Co., Baltimore, Md.
The Improved Equipment Co., 60 Wall St., New York, N. Y.
The Stacey Mfg. Co., Cincinnati, Ohio

GAS PLANTS (Coal) (Engineers)
- Camden Iron Works, Camden, N. J.
- Gas Machinery Co., Cleveland, Ohio
- Isbell-Porter Co., Newark, N. J.
- Semet-Solvay Co., Syracuse, N. Y.
- Steere Engineering Co., Detroit, Mich.
- The Bartlett Hayward Co., Baltimore, Md.
- The Improved Equipment Co., 60 Wall St., New York, N. Y.
- The Parker-Russell Mining & Mfg. Co., St. Louis, Mo.
- The Stacey Mfg. Co., Cincinnati, Ohio
- The Stacey Bros. Gas Construction Co., Cincinnati, Ohio

HEATERS (Space)
- American Stove Co., St. Louis, Mo.
- Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
- Detroit Stove Works, Detroit, Mich.
- Eclipse Gas Stove Co., Rockford, Ill.
- Eriez Stove & Mfg. Co., Erie, Pa.
- Estate Stove Co., Hamilton, Ohio
- Geist Mfg. Co., Atlantic City, N. J.
- General Fire Extinguisher Co., Providence, R. I.
- General Gas Light Co., New York, N. Y., and Kalamazoo, Mich.
- Kidde & Co., 169 Chambers St., New York, N. Y.
- Lawson Mfg. Co., Pittsburgh, Pa.
- Reznor Mfg. Co., Mercer, Pa.
- Roberts & Mander Stove Co., Philadelphia, Pa.
- Strait & Richards, Inc., Newark, N. J.
- The Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
- The Mead Gas Heater Co., Delawanna, N. J.

HEATERS (Garage)
- Kidde & Co., 169 Chambers St., New York, N. Y.

HEATERS (Pressing and Soldering Irons)
- American Stove Co., St. Louis, Mo.
- Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
- Eclipse Gas Stove Co., Rockford, Ill.
- Estate Stove Co., Hamilton, Ohio
- General Gas Appliance Co., 103 Park Ave., New York, N. Y.
- Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
- Strait & Richards, Inc., Newark, N. J.

HIGH PRESSURE SYSTEMS
- Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
- Gas Machinery Co., Cleveland, Ohio
- General Fire Extinguisher Co., Providence, R. I.
- H. Mueller Mfg. Co., New York, N. Y., and Decatur, Ill.
- Selas Co., 521 W. 23d St., New York, N. Y.
- The C. M. Kemp Mfg. Co., Baltimore, Md.
- The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.

HOT PLATES
- American Stove Co., St. Louis, Mo.
- Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
- Detroit Stove Works, Detroit, Mich.
- Eclipse Gas Stove Co., Rockford, Ill.
- Eriez Stove & Mfg. Co., Erie, Pa.
- Rathbone, Sard & Co., Albany, N. Y.
- The Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
- The Michigan Stove Co., Detroit, Mich.
- Union Stove Works, 20 Beekman St., New York, N. Y.
- Weir Stove Co., Taunton, Mass.

INCINERATORS
- Estate Stove Co., Hamilton, Ohio
- Ruud Mfg. Co., Pittsburgh, Pa.

INSTRUMENTS (Measuring, Testing and Recording)
- American Meter Co., 105 W. 40th St., New York, N. Y.
- Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
- Equitable Meter Co., Pittsburgh, Pa.
- D. McDonald & Co., Albany, N. Y.
- Maryland Meter Works, Baltimore, Md.
- Steere Engineering Co., Detroit, Mich.

KILNS (For Firing Glass, China and Pottery)
- The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
- The Parker-Russell Mining & Mfg. Co., St. Louis, Mo.
- The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.

LIGHTERS (Ranges)
- Safety Gas Lighter Co., Haverhill, Mass.
- Strauss Gas Iron Co., Philadelphia, Pa.
- The Michigan Stove Co., Detroit, Mich.
- Welsbach Co., Gloucester, N. J.

LIGHTING (Fixtures)
- Will W. Barnes, 31 Chelsea Place, East Orange, N. J.
- Shapiro & Aronson, Inc., 20 Warren St., New York, N. Y.
- Welsbach Co., Gloucester, N. J.

LIGHTING (Gas Domes, Portables, etc.)
- Will W. Barnes, 31 Chelsea Place, East Orange, N. J.
- Kramer Bros. Lamp Co., 585 Broadway, New York, N. Y.
- Shapiro & Aronson, Inc., 20 Warren St., New York, N. Y.
- Welsbach Co., Gloucester, N. J.

LIGHTING (Glassware)
- Shapiro & Aronson, Inc., 20 Warren St., New York, N. Y.
- Welsbach Co., Gloucester, N. J.

LIGHTING (Incidentals)
- Storrs Mica Co., Owego, N. Y.

LIGHTING (Mantles)

General Gas Light Co., New York, N. Y., and Kalamazoo, Mich.
Lindsay Light Co., New York, N. Y., and Chicago, Ill.
Welsbach Co., Gloucester, N. J.

METAL RECEPTACLES

Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.
United Lead Co., 111 Broadway, New York, N. Y.

METERS

American Meter Co., 105 W. 40th St., New York, N. Y.
Cleveland Gas Meter Co., Cleveland, Ohio
Equitable Meter Co., Pittsburgh, Pa.
John J. Griffin & Co., 1521 Race St., Philadelphia, Pa.
D. McDonald & Co., Albany, N. Y.
Maryland Meter Works, Baltimore, Md.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
The Cleveland Rotary Meter Co., Cleveland, Ohio
The Sprague Meter Co., Bridgeport, Conn.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Rotary Meter Co., 52 Vanderbilt Ave., New York, N. Y.

METER CONNECTIONS, SEALS, Etc.

American Meter Co., 105 W. 40th St., New York, N. Y.
Cleveland Gas Meter Co., Cleveland, Ohio
S. R. Dresser Mfg. Co., Bradford, Pa.
Equitable Meter Co., Pittsburgh, Pa.
D. McDonald & Co., Albany, N. Y.
H. Mueller Mfg. Co., New York, N. Y., and Decatur, Ill.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
The Lattimer Stevens Co., Columbus, Ohio
The Sprague Meter Co., Bridgeport, Conn.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.

METER PROVERS

American Meter Co., 105 W. 40th St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
John J. Griffin & Co., Philadelphia, Pa.
D. McDonald & Co. Albany, N. Y.
Maryland Meter Works, Baltimore, Md.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.

METER SHELF

Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.

OIL (Diaphragm)

John J. Griffin & Co., 1521 Race St., Philadelphia, Pa.

OVENS (Baking and Cooking)

The G. S. Blodgett Co., Burlington, Vt.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eclipse Gas Stove Co., Rockford, Ill.
General Fire Extinguisher Co., Providence, R. I.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
The Crandall-Pettee Co., Hudson St., New York, N. Y.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
The Ohio State Stove & Mfg. Co., Columbus, Ohio
The Union Steel Products Co., Ltd., Albion, Mich.
The Surface Combustion Co., 366 Gerard Ave., Bronx, N. Y.

OVENS (Annealing, Japanning, Drying, Core, etc.)

Gehnrich Indirect Heat Oven Co., Inc., 62 Franklin Ave., Brooklyn, N. Y.
General Fire Extinguisher Co., Providence, R. I.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
The C. M. Kemp Mfg. Co., Baltimore, Md.
The Surface Combustion Co., 366 Gerard Ave., New York, N. Y.
The Union Steel Products Co., Ltd., Albion, Mich.
Young Bros. Co., Detroit, Mich.

OVENS (Warming)

Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eclipse Gas Stove Co., Rockford, Ill.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
The G. S. Blodgett Co., Burlington, Vt.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
The Union Steel Products Co., Ltd., Albion, Mich.

PHOTOMETERS

American Meter Co., 105 W. 40th St., New York, N. Y.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
D. McDonald & Co., Albany, N. Y.
Maryland Meter Works, Baltimore, Md.
Nathaniel Tufts Meter Works, Boston, Mass.

PIPE

Camden Iron Works, Camden, N. J.
General Fire Extinguisher Co., Providence, R. I.

National Tube Co., Frick Bldg., Pittsburgh, Pa.
Steere Engineering Co., Detroit, Mich.
The Bartlett Hayward Co., Baltimore, Md.
United Lead Co., 111 Broadway, New York, N. Y.

PIPE CASTINGS AND SPECIALS
The Bartlett Hayward Co., Baltimore, Md.
The Stacey Mfg. Co., Cincinnati, Ohio

PIPE CLAMPS AND SLEEVES
S. R. Dresser Mfg. Co., Bradford, Pa.

PIPE PACKING
General Fire Extinguisher Co., Providence, R. I.
United Lead Co., 111 Broadway, New York, N. Y.

PIPE TOOLS (Caulking, Cutting, Tapping)
General Fire Extinguisher Co., Providence, R. I.
H. Mueller Mfg. Co., New York, N. Y., and Decatur, Ill.
United Lead Co., 111 Broadway, New York, N. Y.

PLATE WARMERS
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.

PORCELAIN ENAMEL PARTS
(Stoves, Lamps, Linings, Stamping and Spinnings)
Baltimore Enamel & Novelty Co., Baltimore, Md.
Eclipse Gas Stove Co., Rockford, Ill.
The Enamel Products Co., Cleveland, Ohio
The Union Steel Products Co., Ltd., Albion, Mich.

PRESSURE GAUGES
American Meter Co., 105 W. 40th St., New York, N. Y.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Gas Machinery Co., Cleveland, Ohio
General Fire Extinguisher Co., Providence, R. I.
D. McDonald & Co., Albany, N. Y.
Maryland Meter Works, Baltimore, Md.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
The Cleveland Rotary Meter Co., Cleveland, Ohio.
Nathaniel Tufts Meter Works, Boston, Mass.

PUMPS
American Meter Co., 105 W. 40th St, New York, N. Y.
Gas Machinery Co., Cleveland, Ohio
Nathaniel Tufts Meter Works, Boston, Mass.

PURIFIERS
Camden Iron Works, Camden, N. J.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Cruse-Kemper Co., Ambler, Pa.
Gas Machinery Co., Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
Steere Engineering Co., Detroit, Mich.
The Bartlett Hayward Co., Baltimore, Md.
The Improved Equipment Co., 60 Wall St., New York, N. Y.
The Stacey Bros. Gas Construction Co., Cincinnati, Ohio
The Stacey Mfg. Co., Cincinnati, Ohio

PURIFYING MATERIALS
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.

RADIATORS
James B. Clow & Sons, Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eriez Stove & Mfg. Co., Erie, Pa.
General Fire Extinguisher Co., Providence, R. I.
Kidde & Co., 169 Chambers St., New York, N. Y.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
The Mead Gas Heater Co., Delawanna, N. J.

RANGES (Domestic)
American Stove Co., St. Louis, Mo.
Bartlett & Co., Inc., Philadelphia, Pa.
Comstock-Castle Stove Co., Quincy, Ill.
Abram Cox Stove Co., Philadelphia, Pa.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Eclipse Gas Stove Co., Rockford, Ill.
Eriez Stove & Mfg. Co., Erie, Pa.
Estate Stove Co., Hamilton, Ohio
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Rathbone, Sard & Co., Albany, N. Y.
Roberts & Mander Stove Co., Philadelphia. Pa.
The Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
The Michigan Stove Co., Detroit, Mich.
The Ohio State Stove & Mfg. Co., Columbus, Ohio
The Peninsular Stove Co., Detroit, Mich.
Union Stove Works, 70 Beekman St., New York, N. Y.
Vesta Gas Range & Mfg. Co., Chattanooga, Tenn.
Weir Stove Co., Taunton, Mass.

RANGES (Hotel)
American Stove Co., St. Louis, Mo.
Comstock-Castle Stove Co., Quincy, Ill.

Abram Cox Stove Co., Philadelphia, Pa.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Eclipse Gas Stove Co., Rockford, Ill.
Estate Stove Co., Hamilton, Ohio
Roberts & Mander Stove Co., Philadelphia, Pa.
The Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
The Michigan Stove Co., Detroit, Mich.

REFRACTORY MATERIALS
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Tate-Jones & Co., Inc., 50 Church St., New York, N. Y.
The Improved Equipment Co., 60 Wall St., New York, N. Y.
The Parker-Russell Mining & Mfg. Co., St. Louis, Mo.

REGULATORS (Governors)
American Meter Co., 105 W. 40th St., New York, N. Y.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Gas Machinery Co., Cleveland, Ohio
H. Mueller Mfg. Co., New York, N. Y., and Decatur, Ill.
Reynolds Gas Regulator Co., Anderson, Ind.
Steere Engineering Co., Detroit, Mich.
The Improved Equipment Co., 60 Wall St., New York, N. Y.
The Cleveland Rotary Meter Co., Cleveland, Ohio
The Sprague Meter Co., Bridgeport, Conn.

REPAIRS (Gas Meters and Appliances)
Maryland Meter Works, Baltimore, Md.

RETORTS
Gas Machinery Co., Cleveland, Ohio
Harbison-Walker Refractories Co., Pittsburgh, Pa.
The Parker-Russell Mining & Mfg. Co., St. Louis, Mo.

RUST PREVENTATIVE
Superior Laboratories, Grand Rapids, Mich.

SCRUBBERS
Camden Iron Works, Camden, N. J.
Gas Machinery Co., Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
Steere Engineering Co., Detroit, Mich.
The Bartlett Hayward Co., Baltimore, Md.
The Improved Equipment Co., 60 Wall St., New York, N. Y.
The Stacey Bros. Gas Construction Co., Cincinnati, Ohio
The Stacey Mfg. Co., Cincinnati, Ohio

SERVICE BOXES, CLAMPS, Etc.
Camden Iron Works, Camden, N. J.
General Fire Extinguisher Co., Providence, R. I.
Hays Mfg. Co., Inc., Erie, Pa.
H. Mueller Mfg. Co., New York, N. Y., and Decatur, Ill.

STILLS (Benzol, Toluol)
The Walter E. Lummus Co., Boston, Mass.

STOVES (Confectioners, Laundry, Tailor)
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.

STRUCTURAL STEEL WORKS (Holders, etc.)
Camden Iron Works, Camden, N. J.
Cruse-Kemper Co., Ambler, Pa.
The Bartlett Hayward Co., Baltimore, Md.
The Stacey Bros. Gas Construction Co., Cincinnati, Ohio
The Stacey Mfg. Co., Cincinnati, Ohio

TANKS (Ammonia, Oil, Water)
Camden Iron Works, Camden, N. J.
Cruse-Kemper Co., Ambler, Pa.
Gas Machinery Co., Cleveland, Ohio
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Steere Engineering Co., Cincinnati, Ohio
The Bartlett Hayward Co., Baltimore, Md.
The Stacey Bros. Gas Construction Co., Cincinnati, Ohio
The Stacey Mfg. Co., Cincinnati, Ohio

THERMOMETERS
American Meter Co., 105 W. 40th St., New York, N. Y.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Gas Machinery Co., Cleveland, Ohio
General Fire Extinguisher Co., Providence, R. I.
Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.

THERMOSTATS
Gas Machinery Co., Cleveland, Ohio
Kidde & Co., 169 Chambers St., New York, N. Y.
Minneapolis Heat Regulator Co., Minneapolis, Minn.
B. Ryan & Co., 60 E. 10th St., New York, N. Y.

THERMO VALVES
Pittsburgh Water Heater Co., Pittsburgh, Pa.

THORIUM
Welsbach Co., Gloucester, N. J.

TRENCH WORK
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.

VALVES

Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Gas Machinery Co., Cleveland, Ohio
General Fire Extinguisher Co., Providence, R. I.
Isbell-Porter Co., Newark, N. J.
Steere Engineering Co., Detroit, Mich.
The Improved Appliance Co., 419 Kent Ave., Brooklyn, N. Y.
The Improved Equipment Co., 60 Wall St., New York, N. Y.

WATER HEATERS

Bartlett & Co., Inc., Philadelphia, Pa.
Abram Cox Stove Co., Philadelphia, Pa.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Eclipse Gas Stove Co., Rockford, Ill.
Estate Stove Co., Hamilton, Ohio
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Humphrey Co., Kalamazoo, Mich.
Kidde & Co., 169 Chambers St., New York, N. Y.
Lawson Mfg. Co., Pittsburgh, Pa.
Long-Landreth-Schneider & Co., New Brunswick, N. J.
Peninsular Stove Co., Detroit, Mich.
Philadelphia Stove Co., Philadelphia, Pa.
Pittsburgh Water Heater Co., Pittsburgh, Pa.
Rathbone, Sard & Co., Albany, N. Y.
Ruud Mfg. Co., Pittsburgh, Pa.
The Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
The Cleveland Heater Co., Cleveland, Ohio
The Hoffman Heater Co., Lorain, Ohio
The Michigan Stove Co., Detroit, Mich.

WATER STILLS (Gas Heated)

Young Bros Co., Detroit, Mich.

WELDED STEEL PIPE

The Bartlett Hayward Co., Baltimore, Md.
Steere Engineering Co., Detroit, Mich.

AMERICAN GAS ASSOCIATION

List No. 28—April, 1919.

Rate Increases Secured.

Where information is not secured from company receiving increase, the source of information is noted in brackets. See Cumulative List of February 5, 1919, for explanation of abbreviations. This list includes only increases reported as secured subsequent to February 5, 1919.

CALIFORNIA

Los Angeles: Economic Gas Co. (Natural) reports increase, effective Mar. 1, 1919: Avge. B. t. u. approx. 815. Class A: 1st 5 MCF 75¢ per M—next 5 MCF 70¢—next 15 MCF 65¢—next 25 MCF 60¢—over 50 MCF 55¢—M. M. Chge. 50¢ per mo. per meter, 4 or more 35¢. Consumers have priority in case of deficiency in supply. Class B: 1st 100 MCF 50¢ per M—next 100 MCF 45¢—over 200 MCF 40¢—M. M. Chge. $50.00 per mo. service limited to supply 30 min. notice, priority over Class C. Class C: 200 to 800 MCF, block scale, 35¢ to 25¢—over 800 MCF 20¢ per M—discontinuance upon notice.

FLORIDA

Miami: Gas Co. reports—under Initiative and Referendum Law, election was held Feb. 6, 1919, and carried making rate effective. Old rate $1.50 per MCF. New rate $1.90 per MCF.

ILLINOIS

Litchfield: P. S. C. allows second temporary increase, effective Dec. 1, 1918. New rate: 1st 10 MCF $1.70 per M—next 15 MCF $1.60—next 25 MCF $1.50—all over 50 MCF $1.40 per M—disct. 10¢ per M each block. M. M. Chge. 55¢ gross, 50¢ net.

MASSACHUSETTS

Framingham: P. S. C. reports public hearing held Feb. 17 on petition of Gas, Fuel & Power Co., second increase granted, effective Feb. 1, 1919: new rate $1.65 net per MCF.

Natick: P. S. C. held public hearing Feb. 17 on petition of Gas Light Co., second increase granted, effective Feb. 1, 1919: new rate $1.75 net per MCF.

Norwood: Gas Co. raised its price from $1.55 net to $1.85 net per MCF and on June 1, 1918, put into effect a "service-at-cost" plan which increased or decreased price every 3 mos. according to costs, resulting in a surchge. of 40¢ at that date and on Sept. 1, 1918, 9¢ making max. net prices $2.25 and $2.75 per MCF resp. At a public hearing Mar. 10, 1919, Board disapproved of "service-at-cost" plan and recommended a price not to exceed $2.50 per MCF, effective Mar. 1, 1919.

MICHIGAN

Battle Creek: Company reports second increase, effective Mar. 1, 1919—from $1.00 per MCF to $1.20 gross, $1.10 net per M.

MISSOURI

St. Charles: Lighting Co. reports increase, effective Mar. 20, 1919: Old rate: 1st 3 MCF $1.35 per M gross, $1.25 net—all over 3 MCF $1.10 gross, $1.00 net—M. M. Chge. 25¢. New rate: 1st 3 MCF $1.50 per M gross, $1.40 net—next 7 MCF $1.30 gross, $1.20 net—over 10 MCF $1.10 net—M. M. Chge. 50¢.

NEW JERSEY

Salem: Gas Light Co. reports P. S. C. allows increase, effective Mar. 21, 1919: Old rate: quarterly consumption 1st 10 MCF $1.55 per M—disct. 10% 10 days—next 10 MCF disct. 15%—next 30 MCF disct. 20%. Annual consumption 200 MCF or over 30% disct. New rate: $1.55 per MCF—5¢ per M disct. 10 days. P. P. Meters $1.50 net per M—S. Chge. 25¢ per mo. per meter.

NEW YORK

Albany: Municipal Gas Co. reports increase, effective Feb. 3, 1919. Old rate: $1.00 net per MCF. New rate: 1st 25 MCF $1.30 per M—next 25 MCF $1.20—all over 50 MCF $1.05—no disct. Rates in effect through a court order although not finally settled and apply to all consumers.

Amsterdam: Chuctanunda Gas Lt. Co. applied for increase of 20¢ per M. After a hearing P. S. C. allowed increase of 10¢ per M only, making new rate effective Mar. 1, 1919: 1st 5 MCF $1.35 per M—next 5 M $1.30—next 10 M $1.25—over 20 MCF $1.15 per M—disct. 10¢ per M—M. M. Chge. 50¢ per mo.

Cohoes: Power & Lt. Corp. reports old rate: 1st 75 MCF $1.00 per M—over 75 M 85¢ per M. New rate, effective Mar. 3, 1919: $1.30 per MCF—M. M. Chge. 50¢ per mo. not incl. meter rental.

Rome: Gas, Elec. Lt. & Pr. Co. reports old rate: 1st 5 MCF $1.20 per M—next 5 M $1.15—next 5 M $1.10—next 5 M $1.05—next 80 M $1.00—next 25 M 90¢—next 25 M 85¢—next 50 M 82½¢—next 50 M 80¢—next 50 M 77½¢—next 50 M 75¢—next 50 M 72½¢—over 400 M 70¢ per M. After 10 days 10¢ per M penalty; M. M. Chge. 48¢ per mo. per meter. New rate, effective July 19, 1918: 1st 10 MCF $1.20 per M—next 15 M $1.15—next 25 M $1.10—next 50 M $1.00—next 100 M 95¢—next 200 M 85¢—next 200 M 80¢—over 600 M 75¢ per M. On all over 600 MCF 1¢ per M added for each 10¢ over $5.50 cost per net ton of coal stored. Penalty unchanged—M. M. Chge. 50¢ per mo. per meter.

Suffern: Gas Co. reports increase, effective Feb. 1, 1919. Old rate: $1.50 gross, $1.40 net per MCF. New rate: $2.00 gross, $1.90 net per MCF.

Tonawanda: Niagara Lt., Ht. & Pr. Co. reports adoption of "Three Charge Rate," effective Feb. 1, 1919, making three rates in effect as follows: First: regular rate for light and fuel $1.20 gross per MCF, $1.00 net; prompt pay. Second: R. T. S. rate in which demand chge. is based on meter required, $3.00 per year per light capacity of meter, plus $9.00 per year consumers' chge., plus 75¢ per MCF consumed—10% disct. on total chge.; prompt pay. Third: R. T. S. chge. based on hourly demand. Demand chge. $72.00 per year per 100 CF of hourly demand, plus $9.00 per year customer chge., plus consumption chge. 30¢ per MCF gas consumed.

PENNSYLVANIA

Palmyra: Annville & Palmyra Gas & Fuel Co. reports protests pending as reported in Cumulative List No. 4 issued Feb. 5, 1919, disallowed by P. S. C. Jan. 14, 1919, and a maintenance chge. allowed of 5¢ per mo. per meter.

VIRGINIA

Portsmouth: Gas Co. reports second increase, effective Mar. 4, 1919. Old rate: $1.30 per MCF, $1.20 net 10 days. New rate: $1.40 gross per MCF, $1.30 net. P. P. Meters $1.40 per M net. M. M. Chge. 5¢ per mo. per meter.

Fuel Economy in the Boiler House---1

JOHN B. C. KERSHAW

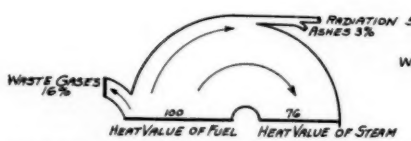
(Chem. and Met. Eng. Vol. 20, Pages 176-178, February 15, 1919).

THIS is the first series of articles dealing with the study and importance of heat losses in boiler plants, and their control—automatic flue gas recorders and details regarding gas sample conduits, tubes, stopcocks, soot filters and water-jet pumps.

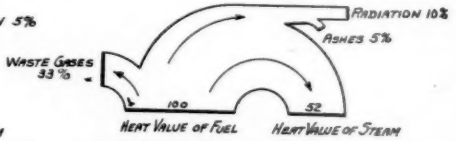
From the diagram, it is seen that a large proportion of the loss is due to heat units being carried away by waste gases; therefore it is essential to analyze flue gas to determine whether or not an excess of air is passed through the furnaces.

Efficiencies of 70 per cent. or over can only be obtained in boiler houses by reducing the volume of waste gases to a minimum and the temperature to the lowest degree consistent with the required draught. The following table shows the relation of heat losses and CO_2 content:

Percentage of CO_2 in waste gases	Percentage of heat lost at —°F of water gases		
	400 °F	500° F	600 °F
4	32.40	40.50	48.60
6	21.80	27.30	32.80
8	16.40	20.80	24.90
10	13.40	16.80	20.20



EFFICIENCY DIAGRAM FOR A WELL MANAGED BOILER PLANT



EFFICIENCY DIAGRAM FOR A BADLY MANAGED BOILER PLANT

Both Plants Burning Bituminous Slack Testing 13,500 B. t. u.

It appears that with the maintenance of a natural draught, the heat loss will be at least 13.4 per cent. Heat losses to chimney of one-third of fuel burned in boiler is very common in practice.

The control of boilers demands regular and systematic examination of waste gases; CO_2 recorders are highly recommended. Troubles which many users experience are:

(1) Pipe connections from boiler flues to gas testing apparatus too long, causing
  (*a*) Leaks, due to large number of joints.
  (*b*) Corrosion of pipes.

(2) Blocking of filter used to remove soot and moisture from gases before they are tested, and

(3) Due chiefly to inexperience of operators.

Recommendations urged to overcome these difficulties are:

(1) Connecting line of not over 30 feet.

(2) Constructed of 6-foot lengths, ½-inch glass tubing, connected with red rubber tubing, wired on, glass being

(a) Non-corrosive.

(b) Transparent (ease of ascertaining necessity of cleaning).

(3) End of each line should have a glass stopcock and T-tube, with long leg of T pointing downward to connect with tube going into flue.

(a) Tube of ⅜ inch external diameter, hard "potash" glass, firmly encased in cork bungs, in ¾ or 1-inch flanged iron guard tubes, when passing through brickwork.

(b) Tubes laid with a fall away from recorder, to drain the condensed water through stopcocks.

(c) Glass stopcocks greased and cleaned once a week.

(4) Entire line should be tested for leaks, using water-jet air pump (vacuum of 8 inches). Tubes should be cleaned by low pressure steam or flushing with warm water. (Withdraw tubes from flues and cool before this treatment.)

(5) One recorder centrally located will be sufficient for six boilers.

(6) Soot filter to conform to following points:

(a) Material—sheet lead or glass (desiccator principle).

(b) Position—close to recorder, where only gas tested will be filtered and only one will be necessary.

(c) Shape—circular, shallow type,

(1) to give large filtration area with small cubical capacity,

(2) to prevent "lags" in test records.

(d) Joint between halves made with rubber gasket ring, and two external rings of hard lead or iron, provided with bolts and thumb-screws.

(e) Filter medium made of either glass wool or asbestos, supported on wire gauze and kept clean.

(7) When using ejector type of water pump,

(a) Use separate water supply tank provided with filtering attachment to retain fine particles of grit which might stop up jet of air pump.

(b) Have steady water pressure.

National Gas Range Week

The "Go-Ahead" Movement in the Gas World

MAY 12-17, 1919

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The Gas Age—Progressive Age Publishing Co (52 Vanderbilt Ave., New York, N. Y.).
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Gas Record (20 W. Jackson Blvd., Chicago, Ill.).
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Jour. Acet. Ltg.—Journal of Acetylene Lighting (Acetylene Journal Publishing Co., Peoples Gas Bldg., Chicago, Ill.).
Natural Gas and Gasoline Journal—The Periodicals Publishing Co., Inc. (Buffalo, N. Y.).

Gas Trade Journals—English.

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The Gas World (John Allen & Co., 8 Bouverie St., London, E. C. 4).

Association Bulletins.

Bulletin B. C. G. A.—British Commercial Gas Association (47 Victoria St., Westminster, London, S. W.).
Bulletin Empire State Gas & Electric Association (29 W. 39th St., New York, N. Y.).
N. E. L. A. Bulletin—National Electric Light Association (29 W. 39th St., New York, N. Y.).
Trans. I. E. S.—Illuminating Engineering Society (29 W. 39th St., New York, N. Y.).
Jour. R. Soc. of Arts—Journal of the Royal Society of Arts (John St., Adelphi, London, W. C. 2).
A Thousand and One Uses for Gas (British Commercial Gas Association, 47 Victoria St., Westminster, London, S. W., England).

House Organs.

Advance Club News (Peoples Gas Light & Coke Co., Chicago, Ill.).
The Doherty News (Doherty Publishing Corporation, 60 Wall St., New York, N. Y.).
Gas and Electric News (Rochester Railway & Light Co., Rochester, N. Y.).
Gas Logic (Consolidated Gas Co., New York, No. 1 Madison Ave., New York, N. Y.).
Pacific Service Magazine (Pacific Gas & Electric Co., San Francisco, Cal.).
Service (Public Service Gas Co., Newark, N. J.).
Southern Public Utilities Magazine (Charlotte, N. C.).
U. G. & E. E. Bulletin (United Gas & Electric Engineering Corporation, 61 Broadway, New York, N. Y.).

Miscellaneous Publications.

Aera (American Electric Railway Association, 8 W. 40th St., New York, N. Y.).
General Electrical Review (General Electric Co., Publication Bureau, Schenectady, N. Y.).
Printers Ink (185 Madison Ave., New York, N. Y.).
Public Service (122 S. Michigan Ave., Chicago, Ill.).
System (Wabash Ave. and Madison St., Chicago, Ill.).

Data is listed from periodicals received at Association Headquarters up to the tenth of the current month.

NOTE.—The following list includes references to articles published from February 20 to March 20, 1919.

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		Am. G. E. Jour., Mar. 8, 222; Mar. 22, 249
		Gas Record, Mar. 12, 137
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		Am. G. E. Jour., Mar. 22, 255
Industrial Committee		G. Jour. of C., Mar., 105
Manufacturers Section		G. Jour. of C., Mar., 93
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		Am. G. E. Jour., Mar. 22, 251
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Technical Section		Am. G. E. Jour., Mar. 22, 261; Mar. 29, 285
Affiliation		Am. G. E. Jour., Mar. 1, 199
Gas Sales, Association (Boston, Feb. 14)		Am. G. E. Jour., Mar. 15, 235
Illinois Gas Association (Chicago, Mar. 19-20)		Gas Record, Feb. 26, 133
		Am. G. E. Jour., Mar. 29, 279
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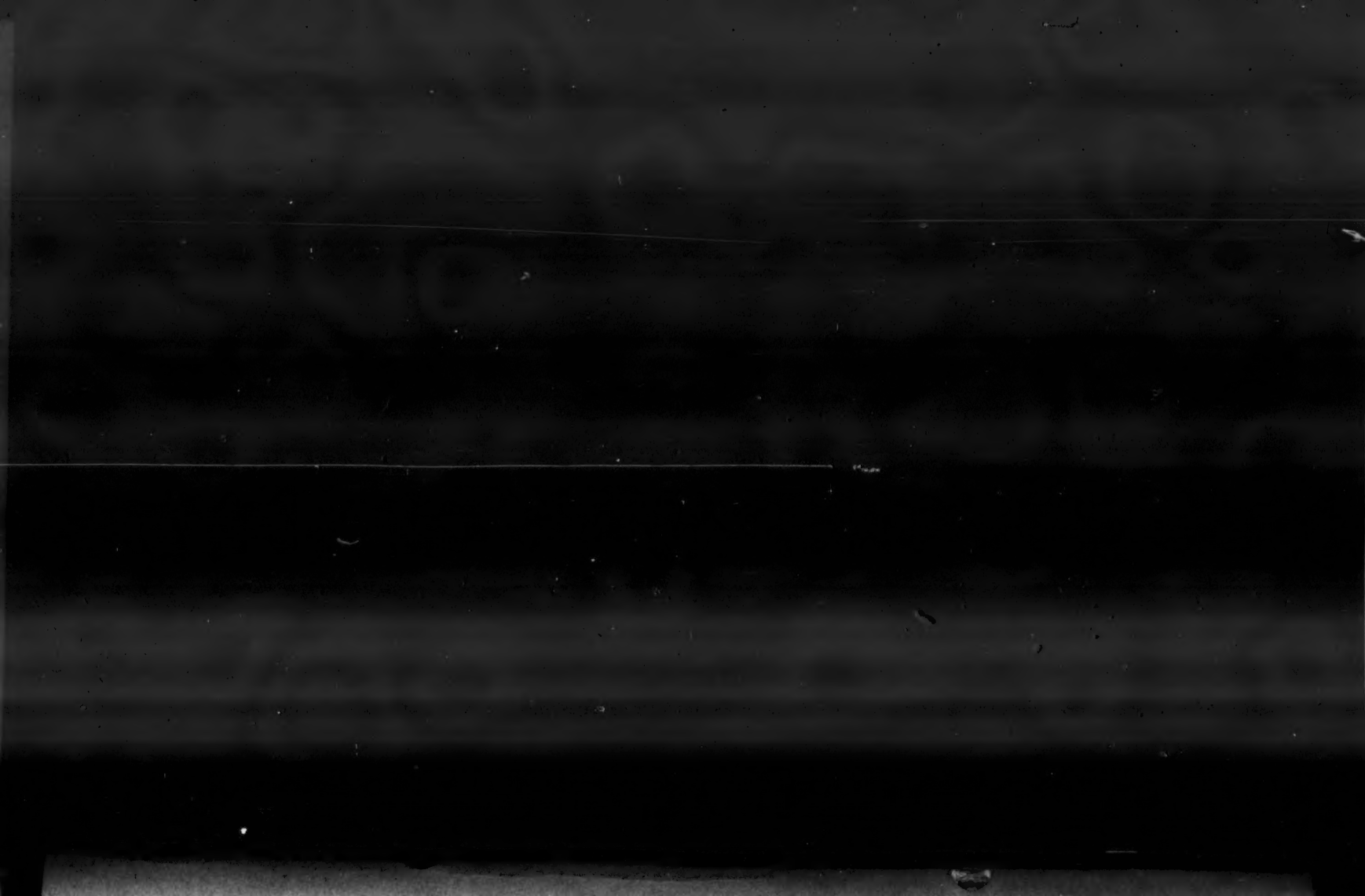
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